

Presenting Eyewitness Confidence to Jury Members: The Influence of Verbal,  
Numerical, and Graphical Expressions of Confidence

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## Statement of Sources

I declare that this report is my own original work and that contributions of others have been duly acknowledged.

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Numerical, and Graphical Expressions of Confidence

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## Abstract

Eyewitness identification is susceptible to error and, despite robust evidence that eyewitness confidence can provide an index of identification accuracy, there remains uncertainty as to how confidence should be collected and presented to jurors. Current guidelines recommend collecting confidence “in the witness’s own words”, but non-standardised expressions may be difficult for jurors to interpret. Two studies investigated the influence of verbal, numerical, and graphical expressions of eyewitness confidence on jury decision-making. Study One asked 44 (male=18, female=26) jury eligible participants (i.e., 18 years of age or older) to convert 16 verbal expressions of confidence to a percentage score, in terms of estimated eyewitness accuracy. There was substantial variability in participants’ responses, suggesting that verbal expressions of confidence may have limited diagnostic value. In Study Two, 163 jury eligible participants read a mock police report and court transcript including testimony from an eyewitness, who identified the suspect and provided a numerical confidence estimate. Study two tested whether numerical confidence estimates facilitated framing effects that might make uncertainty salient and reduce jurors’ perceptions of identification reliability. We found little evidence of framing effects for numerical expressions of confidence. However, we also found that participant did not discriminate between moderate and high confidence estimates.

*Keywords:* jury decision-making, eyewitness confidence, salience, verbal, numerical



Eyewitness identification describes the process where an individual who has witnessed a crime is presented with a line-up (live or photo array; containing a suspect who may or may not be guilty, and other people who are known to be innocent) and attempts to identify which line-up member (if any) they believe to be the perpetrator (Wells, 1993). Eyewitness testimony is used within criminal and civil trials, and is often regarded as a chief form of evidence within a court of law (Powell, Garry, & Brewer, 2013). Despite the weight placed on eyewitness testimony by jury members, eyewitness identification can be prone to error and systematic distortion (e.g., Brewer & Wells, 2006; Bradfield, Wells & Olson, 2002; Wixted & Wells, 2017). Two types of errors an eyewitness can make when selecting from a line-up include identifying an innocent person or failing to identify a guilty person (Malpass & Devine, 1981). The first error is thought to be more detrimental, as it both incriminates an innocent suspect and increases the likelihood that the true perpetrator remains undetected (Malpass & Devine, 1981).

Despite the problems accompanying conventional eyewitness identification, there is now a compelling body of research demonstrating that eyewitness confidence can be informative in evaluating the reliability of identification evidence (Brewer & Wells, 2006; Palmer et al., 2013; Keast, Brewer, & Wells, 2007; Wixted & Wells, 2017). Specifically, there is robust evidence that initial estimates of eyewitness confidence hold diagnostic power (i.e., there exists a meaningful, positive confidence-accuracy relationship; e.g., Brewer & Wells, 2006; Palmer et al., 2013). Whilst it is apparent that initial confidence estimates should be presented within a court of law, there are currently no systematic protocols in place for recording and presenting eyewitness confidence in a way that augments its informative value (Sauer & Brewer, 2015). This, in turn, may undermine the efficiency of confidence

as an index of accuracy, within the applied setting of a court room (Sauer & Brewer, 2015).

As noted by Sauer and Brewer (2015), a key issue to consider when collecting confidence estimates from an eyewitness is which scale would best capture its informative value. Where identification policy does mention confidence, it typically offers some variation of the suggestion that the witness' confidence should be recorded "in their own words" (e.g., Technical Working Group for Eyewitness Evidence, 1999, p.38; Sauer & Brewer, 2015). However, variability in people's interpretation of verbal expressions of probability has been demonstrated within a number of real-world settings (e.g., O'Brien, 1989; Handmer & Proudley, 2007; Barclay et al., 1977). If this tendency were to extend to the courtroom, presenting jurors with verbal expressions of eyewitness confidence might lead to variability in interpretation across jury members. Although numerical methods of collecting and presenting eyewitness confidence might provide a viable alternative (Sauer & Brewer, 2015), there is some suggestion that numerical expressions of confidence may quantify eyewitness uncertainty to an objectionable extent. Specifically, prosecutors may worry that numerical confidence estimates will be "easily undermined" by the defence council (Sauer & Brewer, 2015, p. 201). Given what we know about the effects of framing (Levin, Schneider & Gaeth, 1998), this concern may not be unfounded. Accordingly, there does exist some uncertainty as to whether eyewitness confidence should be collected and presented in verbal or numerical format.

The over-arching aim of the present research is to explore the most effective way in which to collect and present initial eyewitness confidence estimates to jury members within a court of law. To meet this goal, two studies are conducted

exploring juror perceptions of verbal, numerical, and graphical expressions of eyewitness confidence.

### ***The Confidence-Accuracy Relationship***

Before exploring juror perceptions of eyewitness confidence, it is necessary to consider the confidence-accuracy (CA) relationship as it relates to eyewitness identification.

There is now a compelling body of research demonstrating that eyewitness confidence can be informative in evaluating the reliability of identification evidence, where a confidence estimate is taken from a chooser (i.e., an eyewitness who makes an identification) immediately after they select from a line-up (Brewer & Wells, 2006; Palmer et al., 2013; Keast, Brewer, & Wells, 2007, Wixted & Wells, 2017). Brewer and Wells (2006), for example, conducted an experiment in which 1,200 participants witnessed a simulated crime, and were asked to identify a waiter and a thief from two independent line-ups. Choosers (participants identifying someone) and non-choosers (participants rejecting the line-up) were asked to provide a confidence rating (reflecting the likely accuracy of the decision) immediately after having made a selection (or lack thereof), indicating their response on a 11-point scale from 0% to 100% confident. For choosers, there existed a positive CA relationship across all identification procedures (i.e., biased or un-biased ‘line-up instructions’, high or low ‘foil similarity’, and target-absent or target-present) for both suspect line-ups (Brewer & Wells, 2006). The calibration between confidence and accuracy was stronger in the upper half of the confidence scale, particularly for confidence estimates at 90% or higher (Brewer & Wells, 2006). This is consistent with research conducted Palmer et al. (2013), who also found that the CA calibration

becomes stronger with increased ratings of confidence. There was no evidence of a meaningful CA relationship for non-choosers (Palmer et al., 2013).

It is necessary to reiterate that the CA relationship holds true only for confidence ratings taken immediately after an identification (Sauer & Brewer, 2015). A number of biases can act to undermine the CA relationship after an identification has taken place (e.g., Luus & Wells, 1994; Shaw & McClure, 1996). Luus and Wells (1994), for example, examined the effect of co-witness feedback on 140 eyewitnesses, who had already made a selection from a mock photo line-up. Amid other findings, informing participants that a co-witness had selected the same line-up member inflated their original estimates of confidence (while obviously not affecting accuracy). Similarly, Shaw and McClure (1996) investigated the effect of post-event questioning on college students who had witnessed a staged altercation. For elements of the event that had been the focus of repeated questioning, participants increased their ratings of confidence with no associated increase in accuracy (Shaw & McClure, 1996).

In light of the above evidence, researchers have recommended a simple solution: take a measure of eyewitness confidence immediately after a witness has selected from a line-up, and present this record of the witness' confidence to jury members (Sauer & Brewer, 2015; Wixted & Wells, 2017). However, an important question remains unanswered; how should eyewitness confidence be measured and then presented to jury members within a court of law? Should it be presented in verbal, numerical, and/or graphical format?

### ***Measuring and Presenting Eyewitness Confidence: Verbal Expressions of Confidence***

Where identification policies mention confidence, they typically offer some

variation of the suggestion that the witness' confidence should be recorded in their "own words" (e.g., Technical Working Group for Eyewitness Evidence, 1999, p.38; Police and Criminal Evidence Act Code D, 2017; Sauer & Brewer, 2015). This preference for verbal expressions of confidence is supported in part by research conducted by Windschitl and Wells (1996), who investigated the effect of measuring psychological uncertainty using verbal and numerical methods. This research demonstrated that verbal expressions of uncertainty, solicited through the presentation of multiple scenarios, were more sensitive "to various manipulations affecting psychological uncertainty" (e.g., framing and context), more predictive of participants "individual preferences", and better reflected "behavioural intentions" (Windschitl & Wells, 1996, p. 343). Hence, verbal expressions of confidence may provide a more sensitive index of the eyewitness's psychological uncertainty (Windschitl & Wells, 1996, p. 343).

Nonetheless, variability in people's interpretation of verbal expressions of probability has been demonstrated within a number of real-world settings; this includes the areas of medicine (O'Brien, 1989), weather forecasting (Handmer & Proudley, 2007), and the military (Barclay et al., 1977). For example, O'Brien (1989, p. 98 - 99), conducted a study in which General Practitioners (GPs) provided a 'percentage probability' rating (0-100%) for 23 phrases or words (e.g., 'likely' or 'low risk'), that might be used to characterise uncertainty when describing to a patient the likelihood of experiencing a headache from a prescribed medication. Although more extreme verbal expressions of probability (e.g. 'never' and 'certain') were given more consistent probability ratings, other phrases, such as "significant chance", yielded ratings that differed by as much as 47% (O'Brien, 1989, p. 98-99). Similarly, in a study conducted by NATO intelligence analysts, 23 officers were

asked to provide a numerical estimate of the probability of a certain military event taking place, based on various verbal expressions of uncertainty (Barclay et al., 1977, p. 79). The resulting data illustrated a large variation in the officers' interpretation of each phrase (see Appendix A, Figure 5).

Applying these findings to the current context, it is apparent that verbal expressions of Eyewitness confidence might lead to inconsistent interpretations across jury members. Moreover, jurors' interpretation of the degree of (un)certainly associated with the identification might vary significantly from the witness' intended level of (un)certainly. If so, this would undermine the informational value of verbal expressions of confidence. Study One directly tests this idea, investigating whether the previously demonstrated variability in interpreting verbal expressions of confidence would translate to the eyewitness identification context.

### ***Measuring and Presenting Eyewitness Confidence: Numerical Expressions of Confidence***

Although the above findings may point to the use of numerical expressions of eyewitness confidence, there does exist some suggestion that numerical expressions of confidence might emphasise eyewitness uncertainty to an objectionable extent (see Sauer & Brewer, 2015, for a review). As noted by Sauer and Brewer (2015, p. 201), prosecutors may worry that numerical confidence estimates will be “easily undermined” by the defence council where eyewitness confidence is reframed in terms of uncertainty. Based on a review of the ‘framing effect’ within psychological literature (e.g., Levin, Schneider & Gaeth, 1998), this concern may not be entirely unfounded.

### ***Framing Effects and Numerical Estimates of Confidence***

Before considering how framing effects might affect jurors' perceptions of

eyewitness identification evidence, it is first necessary to provide some general information about framing effects.

‘Valence framing’ describes a phenomenon where objectively equivalent information is evaluated differently, as a function of whether it is presented in a “positive or negative light” (Levin, Schneider & Gaeth, 1998, pg.150). Levin and Gaeth (1988), for example, found that participants rated beef labelled as ‘75% lean’ more positively than beef labelled as ‘25% fat’, despite these pieces of information being objectively equivalent. According to Levin & Gaeth (1988), attribute framing (a form of valence framing) may occur as people encode information in terms of its “descriptive valence” (Levin, Schneider & Gaeth, 1998, p. 164). According to this theoretical account, the positive framing of an event or object may produce more positive associations within a person’s memory, thus facilitating more favourable judgements. If the same attribute is labelled as negative, however, an individual may encode this information in such a way that elicits negative associations (Levin & Gaeth, 1988; Levin, Schneider & Gaeth, 1998). This phenomenon is considered fairly robust and has been observed across a range of contexts (e.g. medicine, business, finance, and gambling; Levin, Schneider & Gaeth, 1998).

A closely related theoretical account is Prospect Theory (Kahneman & Tversky, 1979), which stipulates that information framed in a positive or negative light emphasises the “gains” and “losses” of a given situation, respectively (Levin, Schneider & Gaeth, 1998, p. 152). According to this theory of ‘risky choice framing’, positive frames are more likely to elicit risk aversion (i.e., where people try to reduce the uncertainty associated with a particular decision), whilst negative frames can encourage risk seeking in order to minimise or eliminate losses (Levin, Schneider & Gaeth, 1998; Tversky & Kahneman, 1981; Kahneman & Tversky,

1979). A classic experiment exploring this phenomenon was undertaken by Tversky & Kahneman (1981, p. 453), where they asked participants to decide between two programs that were designed to combat a hypothetical “Asian Disease” which was “expected to kill 600 people”. There existed two equivalent versions of the medical-decision-problem, where the problem was framed in a positive or negative light. In the positive frame, participants were asked to choose between Program A, where “200 people will be saved”, and Program B, where “there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved”. In the negative frame, participants were asked to choose between Program C, where “400 people will die”, or Program D, where “there is a 1/3 probability that nobody will die, and 2/3 probability that 600 people will die” (Tversky & Kahneman, 1981, p. 453). As per the theory of risky-choice framing, participants exposed to the positive frame were more likely to choose the sure option (Program A), whilst participants exposed to the negative frame were more likely choose the risky option (Program D; Tversky & Kahneman, 1981; Levin, Schneider & Gaeth, 1998 ).

In light of the framing literature, it is important to consider how numerical quantifications of confidence will affect juror’s perceptions of eyewitness accuracy. Relative to the binary method of presenting eyewitness evidence (i.e., indicating that the eyewitness did or did not select the suspect-come-defendant from a line-up), numerical confidence estimates clearly outline the certainty of a witness (e.g., “I am 90% certain”; Sauer & Brewer, 2015). However, this method also allows the defence council to clearly reframe the eyewitness’ expression of confidence in terms of uncertainty (e.g., 90% certain becomes 10% uncertain). Hence, as noted by Sauer and Brewer (2015), the prosecution may worry that this reframing of the identification evidence will make eyewitness uncertainty more salient to jury



members, thus undermining the perceived reliability of the identification evidence. Such effects would be particularly problematic at higher levels of confidence, where accuracy tends to be higher and jurors should put more stock in the identification evidence (e.g., Brewer & Wells, 2006; Palmer et al., 2013). Although framing effects are robust in the literature, it is necessary to note that a number of factors can mitigate the impact of framing (Levin, Schneider, & Gaeth, 1998; Druckman, 2001).

### ***Mitigating the Effects of Framing***

Although there is reason to believe that numerical quantifications of confidence might leave jurors susceptible to a framing effect, it is necessary to explore the conditions in which framing effects are more or less likely to occur. As noted by Levin, Schneider, and Gaeth (1998), there are a number of factors that can reduce or eliminate the impact of framing, where the labelling of a given attribute as positive or negative (e.g., 90% confidence vs. 10% uncertainty) does not influence decision-making. Engaging in deeper elaboration is one such factor that has been shown to reduce the effects of framing (Levin, Schneider & Gaeth, 1998; Druckman, 2001; Takemura, 1994). For example, Takemura (1994) conducted a study using the same methodological approach and medical-decision-problem as Tversky and Kahneman's (1981), with one exception; participants were asked to either think about and write down a justification for their chosen option (i.e., high elaboration) or merely decide between the two available options (i.e., low elaboration). Where participants engaged in low elaboration, the findings were consistent with that of Tversky & Kahneman's (1981), as participants demonstrated sensitivity to the risky-choice frame. Where participants did engage in deeper elaboration, however, there was no framing effect (Takemura, 1994). This phenomenon may be explained with reference to literature on dual processing theories.

Dual processing theories, such as the Elaboration Likelihood Model (Petty & Cacioppo, 1981, cited in Petty & Cacioppo, 1986), stipulate that people can engage in two “classes of cognitive operations” (Croskerry, 2009, p. 28; Evans, 2008; Kahneman & Frederick, 2002). ‘System one’ (Stanovich & West, 2000; Petty & Cacioppo, 1981, cited in Petty & Cacioppo, 1986) relies on the use of heuristics (mental short cuts), requires minimal cognitive effort, and is vulnerable to error and cognitive bias (Stanovich & West, 2000; Croskerry, Abbass, & Wu, 2008). ‘System two’, on the other hand, is associated with slow and careful deliberation, greater cognitive investment, and is less automatic by nature (Stanovich & West, 2000; Petty & Cacioppo, 1981, cited in Petty & Cacioppo, 1986). Despite some debate within the literature, many authors agree that the framing effect arises from ‘system one’, or ‘low-level’ processing (Cassotti et al., 2012; Donovan, & Jalleh, 2000; Guo, Trueblood, & Diederich, 2017; McElroy, & Seta, 2003; Kahneman & Frederick, 2002; 2007). Accordingly, if jurors do engage in ‘system two’ processing (e.g., deeper elaboration; Takemura, 1994) when considering evidence in court, reframing eyewitness confidence in terms of uncertainty may not undermine the perceived reliability of the identification evidence. In order to explore this possibility, it is necessary to consider whether people do engage in deeper thought/deliberation when acting as juror, and whether this safeguards them against cognitive bias.

The main role of a jury within a court of law is to decide whether the defendant is guilty or not guilty of a given crime, based on the facts (i.e., evidence) of the case (White & Perrone, 2015). Given that the evaluation of evidence is central to their role as juror, one might expect jurors to engage in deep, critical thought when evaluating evidence. This is supported, in part, by research conducted by Gastil, Burkhalter & Black (2007), who gathered survey data from Seattle residents who had

served as jurors at the Seattle Municipal Courthouse. Survey responses indicated that from 55 juries (where at least two jury members responded to a second-wave survey), 89% had jury members who agreed or strongly agreed that the jury in which they sat “thoroughly discussed the relevant facts of the case” (Gastil, Burkhalter & Black, 2007, p. 350). However, self-report measures can be subject to social desirability bias, and need to be interpreted with care (e.g., van de Mortel, 2008). Moreover, there does exist some real-world examples which suggest that jurors do not always carefully evaluate evidence. For example, a three-month drug trial in Australia was terminated in 2008 when a number of the jury were found to be playing Sudoku and other word games during the trial (Davies, 2008). Similarly, in 2017, a jury within the Dublin Circuit Criminal Court was dismissed when a jury member was found to be asleep, 15 minutes after the commencement of the trial (Hayes, 2017).

Although it is unwise to generalise from anecdotal evidence, it is clear that not all jurors are motivated to critically evaluate the facts of a given case. Furthermore, where a juror is motivated to engage in deeper elaboration, this may not safeguard them against cognitive biases such as the framing effect. This is because there a number of factors - such as fatigue (Croskerry, 2009), affect (Croskerry, Abbass, & Wu, 2008; Croskerry, 2005; Slovic et al., 2007), and distraction (Petty & Cacioppo, 1986) - that can impede on the application of type two processing when reasoning about a particular stimulus. Given that jurors can be required to sit in a court room for hours at a time (e.g., O’Keeffe, 2018), listening to a multitude of evidence that may be emotionally taxing (Robertson, Davies & Nettleingham, 2009), it is not implausible that jurors resort to more automatised or heuristic based judgements. This argument is supported by literature on jury

decision-making which stipulates that there are a number of non-evidential factors that can influence a mock-juror's perception of guilt, including race of the defendant (e.g., Mitchell et al., 2005), race and gender of the victim (e.g., Williams, Demuth, & Holcomb, 2007), and physical attractiveness of both the defendant and victim (e.g., Vrij & Firmin, 2001). Hence, where jurors are motivated to evaluate evidence conscientiously, they may still be susceptible to cognitive biases such as the framing effect.

### ***Graphical Expressions of Confidence***

Another factor that reduces the effects of framing is the presentation of visual aids (Garcia-Retamero & Galesic, 2010). Garcia-Retamero and Galesic (2010, p. 1325), for example, conducted an experiment investigating the effect of visual aids when presented alongside medical risk information framed in a positive or negative light (e.g., "9 in 1,000 people die from this surgery" vs. "991 in 1,000 people survive this surgery"). The results indicated that participants with low numeracy were significantly more likely to fall prey to a valence framing effect than participants with high numeracy. This difference, however, was mitigated when participants with low numeracy were presented with some forms of visual aid (e.g., a bar graph) alongside the medical risk information (Garcia-Retamero & Galesic, 2010).

Although explanations as to why people low in numeracy may be more susceptible to the framing of numerical risk information vary, Reyna et al. (2009) suggested that, due to difficulty in deciphering the meaning of numerical material, people low in numeracy rely more-so on 'affective interpretations' of risk information. It therefore follows that people low in numeracy may be more sensitive to the way in which information is framed, rather than the numerical expression itself. This explanation is supported by a literature review conducted by Garcia-

Retamero and Cokely (2017, p. 598), who concluded that transparent visual aids can improve people's comprehension of risk information by increasing "the likelihood" that an individual will engage in deeper elaboration about the "relevant risks and trade-offs" of a given scenario. For example, Garcia-Retamero, Cokely, Wicki, et al. (2016) demonstrated that presenting surgeons low in numeracy with a visual aid increased their comprehension of results from an experimental trial detailing post-surgical side effects, by increasing the time taken to deliberate about the relevant risks. Deeper deliberation may also facilitate improved "cognitive self-evaluation", thus enhancing cognitive monitoring (e.g., awareness of overconfidence; Garcia-Retamero & Cokely, 2017, p. 582, 599). Hence, visual aids may encourage people to engage in deeper more-elaborative processing, thus reducing the influence of a framing effect (Takemura, 1994). It is therefore necessary to consider these findings within the context of jury decision-making.

According to a number of longitudinal studies, there still exists a sizable rate of low numeracy within developed countries (Garcia-Retamero & Cokely, 2017). Galesic and Garcia-Retamero (2010), for example, conducted a large representative study in both Germany and US, with findings that pointed to more than 25% of the adult population experiencing severe innumeracy. Given that jury members (traditionally) are selected at random from the electoral register (White & Perrone, 2015), it is likely that some members of a jury will have low numeracy. Presenting jurors with a graphical representation of EW confidence may therefore be an effective means of reducing a framing effect, where eyewitness uncertainty is made salient (i.e. 10% uncertainty). It is important to note, however, that graph-literacy (i.e., the ability to interpret quantitative information presented in graphical form) can act as a moderating variable, in that people who experience difficulty in reading

graphical information may not benefit from a visual aid (Garcia-Retamero & Cokely, 2017). Moreover, research into visual aids and their effects on framed information has largely been conducted within a health-risk/medical domain (e.g. Garcia-Retamero & Galesic, 2010; Garcia-Retamero & Cokely, 2017), and associated findings may not necessarily generalise to a courtroom setting. Accordingly, further research should explore this phenomenon, specifically within the context of jury decision-making.

### ***The Present Studies***

According to the Innocence Project (2017), eyewitness misidentification is a leading cause of wrongful conviction within the US. This, in part, is because eyewitness identification is susceptible to error and systematic distortion where care is not taken during the collection and presentation of EW evidence (Sauer & Brewer, 2015; Wixted & Wells, 2017). Despite robust evidence that initial estimates of eyewitness confidence have diagnostic power (i.e., a meaningful, positive CA relationship; e.g., Brewer & Wells, 2006; Palmer et al., 2013), there remains uncertainty as to how this evidence should be collected and presented to jury members within a court of law (Sauer & Brewer, 2015). Although verbal expressions of probability may lead to variability in juror interpretations, prosecutors may be concerned that numerical quantifications of confidence will be easily undermined by the defence council (e.g., 90% certain becomes 10% uncertain), thus emphasising eyewitness uncertainty to an objectionable extent (Sauer & Brewer, 2015). Given what we know about the effects of framing (see Levin, Schneider & Gaeth, 1998, for a review), this concern may be warranted.

In light of the evidence presented above, the proposed research has two aims. First, to determine whether presenting confidence in verbal format leads to

variability in predictions of accuracy (measured in numeric terms) and, second, to assess whether presenting eyewitness uncertainty in numerical form may leave jurors susceptible to a framing effect (e.g., where attempts making an eyewitness's uncertainty more salient may lead jurors to perceive identification evidence as unreliable), and whether graphical aids (presenting percentages in a graphical/visual form) might attenuate these framing effects. We expect that presenting confidence in word form will lead to variability in predictions of accuracy, and that presenting percentages in a graphical form will minimise valence framing effects that would otherwise be present in.

### **Study One**

#### **Method**

**Participants.** Participants were 44 jury eligible adults (Male=18, Female=26), aged between 18 and 58 years ( $M=25.02$ ,  $SD= 7.83$ ).

There were no inclusion or exclusion criteria other than jury eligibility (i.e., 18 years of age or older). Juries are traditionally composed of members of the general public randomly selected from the electoral register (White & Perrone, 2015). Hence, juries should and can reflect diverse sectors of society and we wanted to let our sample reflect diversity. Survey responses were sourced from first-year psychology students and an international crowd-sourcing site called Prolific Academic. First-year psychology students were granted 30 minutes research participation credit, whilst participants from Prolific Academic were reimbursed £1.00 for adequate completion of the survey.

**Design.** Participants were surveyed, and asked to translate 16 verbal expressions of eyewitness confidence onto a 0 to 100% scale, in terms of estimated eyewitness accuracy. Hence, a within-subjects design was utilised. The study was

conducted as an online questionnaire, with an estimated completion times of 10 minutes.

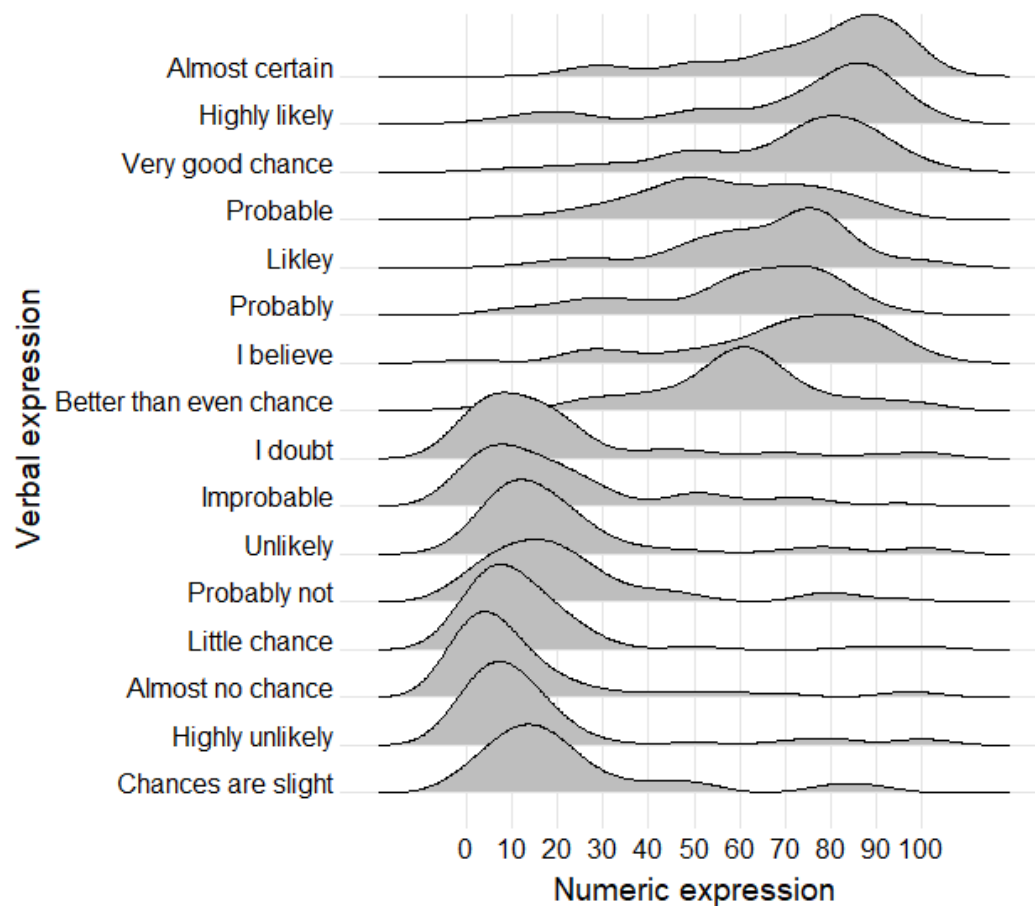
**Materials and Procedure.** Participants were presented with a brief introduction explaining eyewitness identification, and asked to convert 16 verbal expressions of eyewitness confidence (e.g., “I am almost certain that my identification was accurate”) to a percentage score on scale from 0 to 100%, in terms of estimated eyewitness accuracy (where 0%= not at all likely to be accurate, 100%= certain to be accurate; see Appendix B for materials). This study was conducted as an online questionnaire, and the 16 verbal expressions were presented in a randomised order. The verbal expressions of probability were adapted from a similar study conducted by NATO intelligence analysts (Barclay et al., 1977, pg. 79), by re-contextualising each phrase to denote an eyewitness’ expression of confidence (see Appendix A, Figure 5, and Appendix B for a comparison.)

## **Results and Discussion**

Figure 1 depicts the variation in participant interpretations of verbal expressions of eyewitness confidence. This finding is consistent with the findings reported in Barclay (1977, pg. 79) which indicates large variability in people’s interpretation of verbal expressions of probability. Hence, the hypothesis that presenting eyewitness confidence in the format of words will lead to variability in mock-juror predictions of accuracy was supported (see Appendix C, Table 1 for descriptive statistics).

The results from Study One clearly illustrate discrepancy in participants’ interpretations of verbal expressions of eyewitness confidence. This finding is





*Figure 1.* Variability in Participant Interpretations of Verbal Expressions of Confidence

consistent with literature that demonstrates variability in people's interpretation of verbal expressions of probability, within a number of real-world settings (e.g., weather forecasting, medicine, and the military; Handmer & Proudley, 2007; O'Brien, 1989; Barclay et al., 1977). Notably, the pattern of responses observed in Study One closely resembles that of CIA officers in a study by NATO intelligence analysts (Barclay et al., 1977), where the same verbal expressions of uncertainty were used to denote the likelihood of a particular military event taking place (e.g., "it is highly likely" or "it is almost certain"; Barclay et al., 1977, pg. 79). In both instances, numerical estimates attributed to the same 16 verbal expressions of uncertainty differed considerably between participants. Hence, variability in people's interpretation of verbal expressions of probability may extend to a courtroom setting,

as presenting eyewitness confidence in verbal format may elicit inconsistent interpretations across jury members. Likewise, a jurors' interpretation of the degree of (un)certainity associated with the identification may vary significantly from the witness' intended level of (un)certainity.

If there does exist such discrepancy between juror interpretation of verbal expressions of confidence, it does seem unlikely that collecting and presenting eyewitness confidence in verbal format will adequately relay the identification evidence in an informative manner. This is problematic given that confidence estimates taken immediately after an identification can provide an index of accuracy, especially where confidence estimates are higher (e.g., 90% confident; e.g., Brewer & Wells, 2006; Palmer et al., 2013; Sauer & Brewer, 2015). The results from Study One therefore question the validity of identification policy where line-up administrators are advised to collect confidence in the eyewitnesses "own words" (e.g., Technical Working Group for Eyewitness Evidence, 1999, p.38; Sauer & Brewer, 2015).

Before discounting the use of verbal expressions of confidence within a court of law, it is necessary to consider the limitations of the present study. Firstly, participants performed this task independently. Within a real-world setting, it is possible that jurors would discuss with one-another the meaning of a verbal expression of confidence, possibly reducing inconsistency in their interpretations of the identification evidence. Although this is something to consider, the juries interpretation of the degree of (un)certainity might still vary significantly from the witness' intended level of (un)certainity. Secondly, participants within this study interpreted verbal expressions of confidence through the presentation of a written statement (e.g., "I am almost certain that my identification was accurate."). Given

that factors such as “tone of voice” and body language (e.g., hand gestures) can add meaning to spoken communication (Sauer & Brewer, 2015, p. 199; Kelly, et al., 1999), presenting jurors with a video-tape and/or audio-tape of the eyewitness’ verbal expression of confidence might better enhance the informative value of this identification evidence. This possibility should be explored through subsequent research where participants are presented with audio-visual recordings of verbal expressions of eyewitness confidence and asked to provide a corresponding numerical estimate of eyewitness accuracy (i.e., 0% to 100%). Finally, the sample size of this study was relatively small ( $n=44$ ) which may compromise the generalisability of results. Accordingly, future research should seek to replicate this study using a larger sample of participants.

In sum, Study One provides preliminary evidence that collecting and presenting eyewitness confidence to jury members in verbal format will compromise the informative value of the identification evidence, due to variability in people’s interpretation of verbal expressions of confidence. Hence, Study Two attempted to identify whether collecting and expressing eyewitness confidence in numerical and/or graphical format may better serve the purpose of conveying initial confidence estimates to jury members within a court of law.

## **Study Two**

### **Method**

**Participants.** To partake in this study, participants had to be jury eligible (i.e., 18 years of age or older). Survey responses were sourced from; members of the general public via a personal social media account, first-year psychology students from the University of Tasmania (UTAS), an international crowd-sourcing site called Prolific Academic, and individuals who expressed interest in paid research.

Participants sourced from social media were entered into the draw to win a \$50 Coles/Myer voucher, whilst first-year psychology students were granted 30 minutes research participation-credit. Participants sourced from Prolific Academic were compensated £2.50 for adequate completion of the survey, whilst three participants (affiliated with UTAS) who expressed interest in paid research were remunerated with a \$10 Coles/Myer voucher each.

Survey responses from 25 participants were omitted from data analysis, as these participants did not complete the survey. An additional 17 survey responses were omitted, as these participants completed the survey in under 9 minutes or over 120 minutes; results from a pilot study indicated that survey responses completed outside of this time frame (9 minutes-90 minutes) were of highly questionable quality. Omitting these survey responses, the remaining participants were 163 (male: 93, female: 70) jury eligible adults aged between 18 and 81 years ( $M=30.61$ ,  $SD=12.66$ ; excluding 12 survey responses where participants did not enter their age)

**Design.** Participants were randomly allocated to one of eight cells of a 2 (salience/framing: uncertainty salient vs uncertainty not salient)  $\times$  2 (modes of communication: numerical vs numerical expression and graph)  $\times$  2 (eyewitness confidence: high confidence vs moderate confidence) between-subject experimental design (see Appendix D, Table 2 for allocation of participants across conditions). The three dependent variables (DVs) were participants' ratings of likely eyewitness accuracy and suspect guilt, both measured on a 9-point scale (from 'Certain to be inaccurate' to 'Certain to be accurate', and 'Certain to be innocent' to 'Certain to be guilty', respectively), and a categorical verdict of 'guilty' or 'not guilty'. The continuous DV's of belief in eyewitness accuracy and suspect guilt were included in conjunction with the categorical measure of verdict, in order to provide a more

sensitive measure of participant judgements. This was particularly important in Study Two, as participants were asked to base their judgements on limited evidence (i.e., the eyewitness' positive identification of the suspect). The 9-point scale included visual anchors denoting strength or weakness in participant belief (e.g., +++ or ++, see Appendix E), as measuring people's perceptions of numerical information using a numerical scale is arguably counterintuitive.

**Materials and Procedure.** Jury-eligible participants viewed a mock police report (see Appendix F) detailing an armed robbery where an unknown criminal robbed a bank at gun-point, and a suspect, Mr. Green, was taken to the police station for further questioning. Participants then read a corresponding court transcript detailing exchanges between the prosecution, judge, eyewitness, and defence council. The court transcript included testimony from an eyewitness, Mr. Smith, who had previously identified the suspect-come-defendant, Mr. Green, from a 7-man line-up at the police station (see Appendix G, for an example).

The eyewitness provided a statement indicating that their initial confidence at the time of the identification was either high or moderate, depending on the condition. High and moderate confidence was expressed in numerical form (i.e. "90% confident" or "70% confident"), or numerical and graphical form (e.g. "70% confident" plus the depiction of a corresponding bar graph). In the 'uncertainty salient' condition, the trial transcript included an explicit question from the defence council reframing the witness's confidence to explicitly highlight the degree of uncertainty (e.g., "Mr. Smith, you said that at the time of your identification you were 90% confident. Do you therefore acknowledge that you were 10% uncertain as to whether you had correctly identified the true perpetrator from the line-up?"), which was confirmed by the eyewitness ("I do acknowledge this fact"). In the

‘uncertainty not salient’ manipulation, questions from the defence council were omitted so that EW uncertainty was not made salient. Participants then rated likely eyewitness accuracy and suspect guilt on 9-point scales from ‘certain to be inaccurate’ to ‘certain to be accurate’, and ‘certain to innocent’ to ‘certain to be guilty’, respectively. Participants also provided a categorical verdict of ‘guilty’ or ‘not guilty’.

After providing judgements of eyewitness accuracy and suspect guilt, participants completed the Berlin Numeracy test (Cokely et al., 2012) and the Schwartz et al. (1997) numeracy to assess numeracy, and allows us to gauge whether numeracy acted as a moderating variable on the impact of visual aids. When combined, these two tests have been shown to yield a normal distribution of scores with good discriminability, and this method is thought to be suitable when assessing a broad-range of numerical ability (i.e., high and low numeracy) that is present within the general population (Cokely et al., 2012). Participants also completed the Objective Graph Literacy (OGL) scale (Galesic & Garcia-Retamero, 2011) and Subjective Graph Literacy (SGL) scale (Garcia-Retamero et al., 2016), to gauge their ability to interpret quantitative information presented in graphical form (e.g., a bar graph portraying eyewitness confidence). Both scales have been shown to reliably predict people’s understanding of graphical information (Galesic & Garcia-Retamero, 2011; Garcia-Retamero et al., 2016). As in Study One, the entire study was conducted as an online questionnaire.

A court transcript was used within Study Two to manipulate the key variables, as this presentation method is more practical, affordable, and time-effective when compared to its counterparts (e.g., a live re-enactment), and is commonly used within the jury decision-making literature (e.g., Sauer, Palmer, &

Brewer, 2017; see Bornstein, 1999, for a review). In an effort to improve its ecological validity, it was developed in consultation with a practicing lawyer who wishes to remain unidentified.

## Results

**Data Screening.** Before conducting a univariate analysis of variance (ANOVA) separately for each continuous DV, with ‘salience’, ‘confidence’, and ‘graph’ as the independent variables (IV’s), the relevant data assumptions were checked. The assumption of homogeneity of variance was met, as the Levene’s Test of Equality of Error Variances was not significant for participant ratings of belief in eyewitness accuracy ( $p = .285$ ) or suspect guilt ( $p = .402$ ). Inspection of the histograms for the continuous depended variables showed that participant ratings of belief in eyewitness accuracy (skewness =  $-.961$ , kurtosis =  $.408$ ) and suspect guilt (skewness =  $-.260$ , kurtosis =  $.061$ ) were both negatively skewed. Inspection of the Q-Q plot for belief in eyewitness accuracy also demonstrated a distinct curvature. However, this was not considered to be a great problem as ANOVA is relatively robust to violations of normality (Blanca, 2017). Analysis of the box plot for participant ratings of belief in eyewitness accuracy and suspect guilt revealed one extreme outlier (i.e., more than three interquartile ranges from the end of the box) in participant rating of suspect guilt. When the data was analysed excluding this data point the relevant effects remained the same. Hence, all data points were included within the final analysis.

When conducting a hierarchical logistic regression, initial inspection of the Cell Counts and Residual Table revealed that all expected cell counts were greater than 1, and more than 80% of expected cell counts were greater than 5.

### ***Testing for Framing Effects***

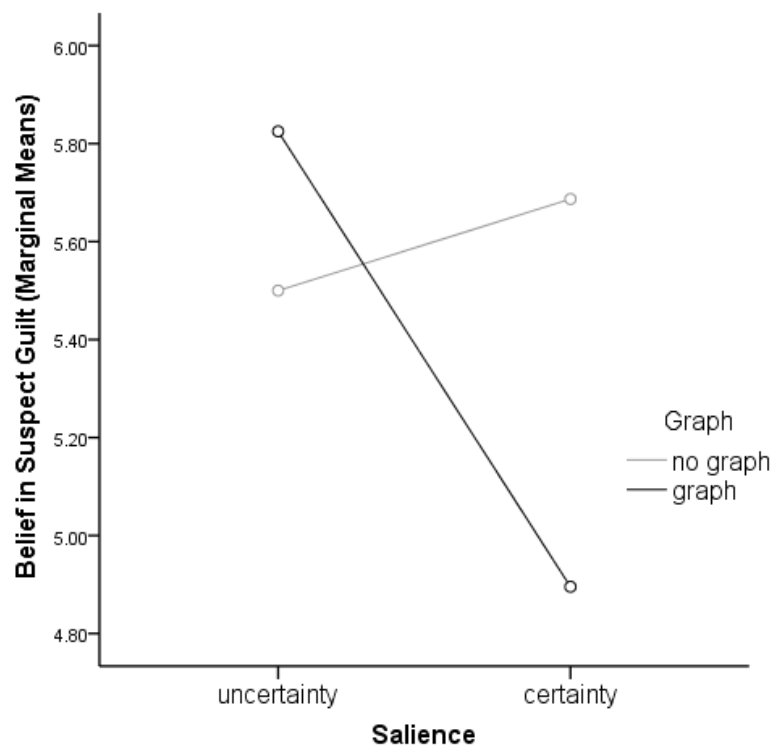
A 2 (Salience/framing: uncertainty salient vs uncertainty not salient)  $\times$  2 (modes of communication: numerical vs numerical expression and graph)  $\times$  2 (eyewitness confidence: high confidence vs moderate confidence) univariate ANOVA (conducted separately for each continuous DV) did not reveal a significant main effect of ‘salience’ on participant ratings of belief in eyewitness accuracy,  $F(1, 155)=2.20$ ,  $MSE=2.97$ ,  $p=.140$ ,  $\eta_p^2=.014$ , or suspect guilt,  $F(1, 155)=2.38$ ,  $MSE=2.36$ ,  $p=.125$ ,  $\eta_p^2=.015$ , as participant ratings of eyewitness accuracy and suspect guilt did not differ significantly as a function of whether eyewitness uncertainty was explicitly highlighted by the defence council ( $M=6.30$ , 95%CI[5.92,6.68] and  $M=5.66$ , 95%CI[5.32, 6.00], respectively) or not ( $M=5.90$ , 95%CI[5.53, 6.27] and  $M=5.29$ , 95%CI[4.96, 5.63], respectively). A hierarchical log linear analysis also revealed that ‘salience’ had a non-significant effect on verdict,  $p>.05$ . Hence, we found no evidence to support the hypothesis that presenting eyewitness uncertainty in numerical form will leave jurors susceptible to a framing effect (e.g., where attempts at making an eyewitness’s uncertainty more salient will lead jurors to perceive identification evidence as unreliable). Numeracy acted a non-significant covariate when exploring the effect of ‘salience’ on participant ratings of belief in eyewitness accuracy or suspect guilt,  $p>.05$ .

However, a univariate ANOVA did reveal a significant interaction between ‘salience’ and ‘graph’ on participant ratings of belief in suspect guilt,  $F(1, 155)=5.38$ ,  $MSE=2.36$ ,  $p=.022$ ,  $\eta_p^2=.034$  (see Figure 2 and Appendix H, Table 3). As indicated by Figure 2, presenting mock-jurors with a visual aid alongside a numerical confidence estimate appeared to increase their rating of suspect guilt



where eyewitness uncertainty was explicitly highlighted (e.g., 10% uncertain), and reduce their rating of suspect guilt where only eyewitness certainty was left salient.

When splitting the data using ‘graph’ (i.e., no graph or graph) to organise output by group, the results indicated a significant main effect of ‘salience’ on participant ratings of belief in suspect guilt where participants were presented with a visual aid,  $F(1, 78)=7.33$ ,  $MSE=2.41$ ,  $p=.008$ ,  $\eta_p^2=.086$ , and a non-significant main effect where participants were not presented with a visual aid,  $F(1, 77)=.307$ ,  $MSE=2.30$ ,  $p=.581$ ,  $\eta_p^2=.004$ . This was inconsistent with the hypothesis that presenting participants with visual aids alongside the numerical confidence estimates would reduce or mitigate any framing effect. Adding graph literacy and numeracy as a covariate did not remove this significant effect.

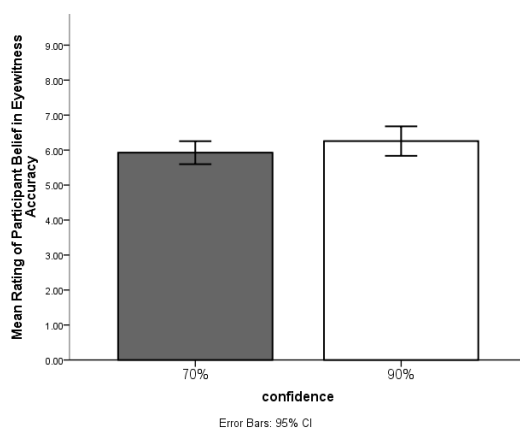


*Figure 2.* Line graph depicting the salience  $\times$  graph relationship on participate ratings of belief in suspect guilt.

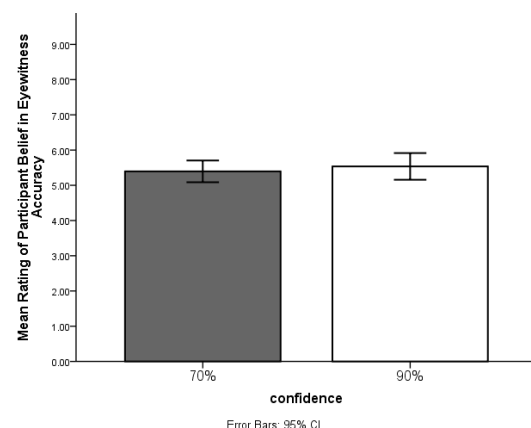
There was not a significant interaction between ‘salience’ and ‘graph’ on participant ratings of belief in eyewitness accuracy,  $F(1, 155)=.734$ ,  $MSE=2.97$ ,  $p=.393$ ,  $\eta_p^2=.005$  (See Appendix H, Table 3). Nor was there a significant main effect of ‘graph’ on participant ratings of belief in eyewitness accuracy,  $F(1, 155)=.013$ ,  $MSE= 2.97$ ,  $p=.908$ ,  $\eta_p^2=.000$ , or suspect guilt,  $F(1, 155)=.939$ ,  $MSE=2.36$ ,  $p=.334$ ,  $\eta_p^2=.006$  (see Appendix H, Table 4). According to the hierarchical log linear analysis, there was also no main effect of ‘graph’ on verdict,  $p> .05$ .

### ***Testing for the Influence of Moderate and High Confidence***

Surprisingly, a univariate ANOVA revealed no significant main effect of ‘confidence’ on participant’s rating of belief in eyewitness accuracy,  $F(1, 155)=1.618$ ,  $MSE=2.97$ ,  $p=.205$ ,  $\eta_p^2=.010$ , or suspect guilt,  $F(1, 155)=.48$ ,  $MSE=2.36$ ,  $p=.489$  (see Appendix H, Table 5), as participant ratings of eyewitness accuracy and suspect guilt did not differ significantly as a function of whether the eyewitness indicated that they were 70% or 90% certain of their identification (see Figure 3 and 4). According to the hierarchical log linear analysis, there was also no main effect of ‘confidence’ on verdict,  $p>.05$  (see Appendix H, Table 6).



**Figure 3.** Mean ratings of belief in eyewitness accuracy and confidence (moderate and high) with 95% confidence intervals.



**Figure 4.** Mean ratings of belief in suspect guilt and confidence (moderate and high) with 95% confidence intervals.

A univariate ANOVA revealed no significant interaction between ‘confidence’ and ‘salience’ on participant ratings of belief in eyewitness accuracy,  $F(1, 155) = .584$ ,  $MSE = 2.97$ ,  $p = .446$ ,  $\eta_p^2 = .004$ , or suspect guilt,  $F(1, 155) = 1.64$ ,  $MSE = 2.36$ ,  $p = .202$ ,  $\eta_p^2 = .010$  (see Appendix H, Table 7). Nor was there a significant interaction between ‘confidence’ and ‘graph’ on participant ratings of eyewitness accuracy,  $F(1, 155) = 1.04$ ,  $MSE = 2.97$ ,  $p = .309$ ,  $\eta_p^2 = .007$ , or suspect guilt,  $F(1, 155) = 1.05$ ,  $MSE = 2.36$ ,  $p = .308$ ,  $\eta_p^2 = .007$  (see Appendix H, Table 8). The hierarchical log linear analysis also revealed no significant interaction between any two of the independent variables,  $p > .05$ .

### ***Testing for a Three-way Interaction***

A univariate ANOVA revealed no significant three-way interaction between ‘salience’, ‘confidence’ and ‘graph’ on participants’ ratings on belief in eyewitness accuracy,  $F(1, 155) = .216$ ,  $MSE = 2.97$ ,  $p = .643$ ,  $\eta_p^2 = .001$  (see Appendix H, Table 9), and suspect guilt,  $F(1, 155) = .845$ ,  $MSE = 2.36$ ,  $p = .359$ ,  $\eta_p^2 = .005$  (see Appendix H, Table 10). The hierarchical log linear regression also revealed no significant three-way interaction between ‘salience’, ‘confidence’, and ‘graph’ on verdict,  $p > .05$ .

## **Discussion**

### ***Numerical Confidence Estimates and the Framing Effect***

The initial hypothesis that presenting eyewitness confidence in numerical form would leave jurors susceptible to framing effect was not supported, as participant ratings of belief in eyewitness accuracy, suspect guilt, and verdict did not differ significantly as a function of whether eyewitness uncertainty was explicitly highlighted by the defence council or not (i.e., if the court transcript included a statement from the defence-council reframing the eyewitness’ confidence in terms of

uncertainty or whether this statement was omitted).

This finding was somewhat inconsistent with the literature on ‘attribute framing’, which stipulates that framing information in a positive and negative light can facilitate favourable and unfavourable judgements, respectively (Levin & Gaeth, 1988; Levin, Schneider & Gaeth, 1998). If attribute framing had occurred within this study, we would have expected participant ratings of eyewitness accuracy and suspect guilt to have been lower where eyewitness uncertainty was explicitly highlighted by the defence council (e.g., Defence Counsel: “do you therefore acknowledge that you were 10% uncertain at the time of the identification?”), and higher where only eyewitness confidence was made salient (e.g., Eyewitness: “I indicated that I was 90% confident at the time of the identification”; see Levin & Gaeth, 1988 for an example). It is necessary to note, however, that the ‘framing’ present in this study differed from traditional studies that investigate valence framing (e.g., where participants are asked to rate beef that is labelled as 75% lean or 25% fat; Levin & Gaeth, 1988), as participants allocated to the negative frame (i.e., where the prosecution reframed eyewitness confidence in terms of uncertainty) were also exposed to an explicit statement from the eyewitness highlighting their confidence (i.e., a positive frame). Accordingly, presenting jurors with eyewitness uncertainty where eyewitness confidence had already been specified may not have evoked a true negative frame, thus failing to elicit a framing effect.

The results of this study were also potentially inconsistent with literature on prospect theory (Kahneman & Tversky, 1979), which stipulates that information framed in a positive or negative light emphasises the ‘gains’ and ‘losses’ of a given situation, respectively (Levin, Schneider & Gaeth, 1998, p. 152). If ‘risky-choice framing’ had played out within this study, we might have expected discrepancy in

participant responses where eyewitness uncertainty had been explicitly highlighted by defence council (a negative frame) or whether this statement had been omitted (a positive frame; Levin, Schneider & Gaeth, 1998, p. 152; Kahneman & Tversky, 1979). This expectation, however, was built on the premise that people might perceive jury decision-making as a risky choice scenario, where eyewitness uncertainty conveys a risk that the suspect is innocent. Accordingly, a risky-choice frame may not have been evoked as participants did not associate eyewitness uncertainty with subsequent risk or loss (see Levin, Schneider & Gaeth, 1998, for a review).

Additionally, there are a number of factors that can reduce or eliminate the impact of framing generally, where labelling a given attribute as positive or negative does not influence decision-making (Levin, Schneider, & Gaeth, 1998; Druckman, 2001; Takemura, 1994). In this study, it is possible that participants engaged in deeper elaboration (i.e., ‘system two’ processing) when interpreting the identification evidence, thus reducing their susceptibility to cognitive bias (e.g., the framing effect; Takemura, 1994; Stanovich & West, 2000; Petty & Cacioppo, 1981, cited in Petty & Cacioppo, 1986). It is important to consider, however, that the crime scenario and evidence presented within this study was an abridged version of what may be presented within a real trial. Accordingly, jurors faced with more complex evidence and time-consuming processes may be less inclined or able to engage in deep elaboration (Petty & Cacioppo, 1981, cited in Petty & Cacioppo, 1986; Crokerry, 2009).

Importantly, numeracy did not appear to mediate the relationship between ‘salience’ (i.e., if the court transcript included a statement from the defence-council reframing the eyewitness’ confidence in terms of uncertainty or whether this

statement was omitted) and participant ratings of eyewitness accuracy, suspect guilt, and verdict, as numeracy (high and low) acted a non-significant covariate.

Accordingly, there was no main effect of ‘salience’ (i.e., a framing effect) irrespective of whether participants had a high or low level of numeracy. Although this is (arguably) inconsistent with literature that stipulates people low in numeracy rely more-so on ‘affective interpretations’ of risk information (Reyna et al., 2009) – and may subsequently be more susceptible to a framing effect (e.g., Garcia-Retamero & Galesic, 2010) – this result is what we would expect given no true framing effect.

The results of this study may therefore reduce potential concern from prosecutors that numerical expressions of eyewitness accuracy will undermine the validity of the identification evidence (i.e., where the prosecution rephrases eyewitness confidence in terms of uncertainty; Sauer & Brewer, 2015), thus supporting the notion that numerical estimates of eyewitness confidence should be collected and presented to jury members within a court of law.

### ***Graphical Confidence Estimates and the Framing Effect***

Although we originally hypothesised that presenting participants with a visual aid alongside the numerical confidence estimates would reduce or mitigate any framing effect (see Garcia-Retamero & Galesic, 2010), the results of this study would suggest that the reverse might be true. Where participants were presented with a visual aid alongside the numerical expression of confidence, there was a significant effect of ‘salience’ on participant ratings of belief in suspect guilt. Analysis of the ‘Salience’  $\times$  ‘Graph’ interaction indicated that presenting participants with a visual aid increased their rating of suspect guilt where eyewitness uncertainty was explicitly highlighted, and reduced their rating of suspect guilt where only eyewitness certainty was made salient. That is, we found no framing effect in the non-graph conditions,

but presenting a graph gave rise to a framing effect.

This finding is counter-intuitive and inconsistent with research conducted by Garcia-Retamero and Galesic (2010, p. 1325), who found that presenting visual aids alongside medical risk information framed in a positive or negative light (e.g., “9 in 1,000 people die from this surgery” vs. “991 in 1,000 people survive this surgery”) mitigated the effects of framing, where participants had poor numeracy. Our results are also discordant with a literature review by Garcia-Retamero and Cokely (2017, p. 598), who concluded that clear visual aids can improve people’s comprehension of risk information generally, by increasing the likelihood that an individual will engage in deeper elaboration. Our results from Study Two appear to contradict previous research on visual aids and their effects on framed information, as presenting participants with a bar graph alongside numerical confidence estimates (i.e., 70% and 90% certain) appeared to elicit a framing effect, as a function of whether eyewitness uncertainty was explicitly highlighted by a defence council or whether this statement was omitted.

Although the findings from Study Two contradict a large body of research (see Garcia-Retamero & Cokely, 2017; Garcia-Retamero & Galesic, 2010), the pattern/direction of the interaction was not entirely surprising. For example, it was originally hypothesised that highlighting eyewitness confidence (i.e., 90% certain) would lead to higher participant perceptions of eyewitness accuracy and suspect guilt, whilst re-framing to emphasise eyewitness uncertainty (i.e., 10% uncertain) would lead to lower participant perceptions of eyewitness accuracy and suspect guilty, despite these numerical confidence estimates being objectively equivalent (see Levin & Gaeth, 1988 for an example). Accordingly, if a visual aid had mitigated the effects of framing (as described above), we would have expected that participant

ratings of belief in suspect guilt, eyewitness accuracy, and verdict would have reduced in the certainty salient condition (i.e., where only confidence was left salient), and increased in the uncertainty salient condition (i.e., where confidence was reframed in terms of uncertainty), thus leading to more consistent ratings between conditions.

It is important to note that research into visual aids and their effects on framed information has largely been conducted within a health-risk/medical domain (e.g. Garcia-Retamero & Galesic, 2010; Garcia-Retamero & Cokely, 2017). Accordingly, results from this study may differ from existing literature, due to potential differences in the thought processes involved in jury decision-making. However, the sample size within this study was considerably smaller than that used by Garcia-Retamero and Galesic (2010;  $n=987$ ), potentially limiting the generalisability of results. Future research should therefore aim to replicate this finding using a larger sample of participants. If a replication attempt yielded similar results, additional research should be conducted exploring the underlying cognitive mechanisms that might explain this finding. As it currently stands, we are unable to provide a coherent explanation as to why the addition of a bar graph may have evoked a framing effect that was not already present.

In summary, the results from Study Two provide preliminary evidence that presenting visual aids alongside numerical confidence estimates may evoke a framing effect where eyewitness confidence is framed in terms of certainty or uncertainty. Given that numerical confidence estimates (presented without a corresponding visual aid) do not appear to undermine the identification evidence where eyewitness uncertainty is explicitly highlighted, depicting the same information in a visual aid does seem unwarranted.



### ***Confidence Estimates (90% vs 70% Certainty)***

Unexpectedly, there was a non-significant difference between juror ratings of eyewitness accuracy, suspect guilt, and verdict (i.e., guilty or not guilty), between participants who were in the moderate or high confidence condition (i.e., where an eyewitness indicated that they were 70% or 90% confident at the time of the initial identification). This apparent lack of discrimination between high and moderate confidence is concerning, as research studying the CA relationship of initial eyewitness identifications has routinely found that choosers (i.e., eyewitness' who do select from a line-up) who provide a confidence estimate of 90% have a higher rate of accuracy than choosers who provide a confidence estimate of 70% (e.g., Brewer & Wells, 2006; Palmer et al., 2013; Keast, Brewer, & Wells, 2007). For example, when Brewer and Wells (2006) asked participants to identify a waiter and thief from two independent line-ups following a staged crime, results of a calibration curve indicated that choosers who provided a 90% confidence estimate were correct approximately 75% - 80% of the time, where non-bias line-up instructions were given. Conversely, where choosers gave a 70% confidence estimate, they were accurate approximately 55% of the time. If jurors do not discriminate between confidence ratings of 90% and 70%, it also begs the question as to whether they would discriminate between numerical confidence estimates of greater disparity (e.g., 60% and 90% certainty).

However, that there does exist evidence to suggest that jurors do discriminate between numerical confidence estimates (e.g., Sauer, Palmer, & Brewer, 2017). For example, Sauer, Palmer, and Brewer (2017) presented participants with a mock court transcript where an eyewitness expressed high (90% confident) or low (50% confident) confidence in their identification of a suspect. They found that guilty

verdicts were considerably higher in the high confidence condition, when compared to the low confidence condition (Sauer, Palmer, & Brewer, 2017). Given that Study Two did not replicate this effect of confidence on participant responses, we should interpret our results with caution. It is also possible that people categorise numerical confidence estimates in terms of high-confidence (e.g., 60%-100%) and low-confidence category (10%-50%), and do not discriminate past this distinction. This might explain why people can discriminate between confidence estimates of 50% and 90% (Sauer, Palmer, & Brewer, 2017), but not 70% and 90%. Future research should seek to explore this possibility.

### ***Summary and Conclusions***

Eyewitness misidentification is a major contributing factor to wrongful conviction within the US (The Innocence Project, 2017). This, in part, is because eyewitness identification is susceptible to error and systematic distortion where care is not taken during the collection and presentation of EW evidence (Sauer & Brewer, 2015; Wixted & Wells, 2017). Although initial estimates of eyewitness confidence can hold diagnostic power (i.e. a CA relationship; e.g., Brewer & Wells, 2006; Palmer et al., 2013), there still remains uncertainty as to how (i.e., in what format) evidence should be collected and presented to jury members within a court of law (Sauer & Brewer, 2015). In order to investigate this question, two studies were conducted examining the impact of verbal, numerical, and graphical expressions of eyewitness confidence on people's decision making and associated judgment.

Study One investigated people's interpretation of verbal expressions of eyewitness confidence. Forty-five participants were asked to convert 16 verbal expressions of eyewitness confidence (e.g., "I am almost certain that my identification was accurate") to a percentage score (i.e., 0 to 100%) in terms of

estimated eyewitness accuracy. In accordance with literature that has demonstrated a large variability in people's interpretation of numerical expressions of probability (e.g., O'Brien, 1989; Handmer & Proudley, 2007; Barclay et al., 1977) there was a sizable discrepancy in participant responses across verbal expressions of confidence. The findings from Study One therefore question the utility of identification policy where line-up administrators/police are advised to collect confidence in the eyewitnesses "own words" (e.g., Technical Working Group for Eyewitness Evidence, 1999, p.38; see Sauer & Brewer, 2015, for a review). The authors do suggest, however, that future research should be conducted where participants are presented with audio-visual recordings of verbal expressions of eyewitness confidence, as factors such as "tone of voice" and body language (e.g., hand gestures) may enhance the informative value of identification evidence presented in verbal format (Sauer & Brewer, 2015, p. 199; Kelly, et al., 1999).

Study Two investigated whether collecting and presenting numerical confidence estimates to jurors within a court of law might provide a viable alternative to verbal expressions of confidence. Participants were presented with a mock police report detailing information about an armed robbery, where a suspect was taken to the police station for further questioning. Participants were then presented with a court transcript including testimony from an eyewitness who had previously identified the suspect-come-defendant from a 7-man line-up at the police station. This court transcript included three manipulations: 'salience' (i.e., if the defence counsel reframed the eyewitness' confidence in terms of uncertainty or whether this statement was omitted), confidence (i.e., if the eyewitness indicated they were 70% or 90% confident), and presentation mode (i.e., if the numerical expression was accompanied by a bar graph or not).

Contrary to potential criticism from prosecutors that numerical expressions of confidence will be easily undermined by the defence council (i.e., by reframing eyewitness confidence in terms of uncertainty; Sauer & Brewer, 2015), results from Study Two did not find a significant main effect of ‘salience’ (unless participants were also presented with a visual aid). This finding arguably supports recommendations that initial estimates of eyewitness confidence should be collected and presented to jury members in numerical format (Sauer & Brewer, 2015). The significant main effect of ‘salience’ when numerical confidence estimates were accompanied by a visual aid was surprising. This finding contradicts literature which stipulates that visual aids act to improve people’s comprehension of risk information generally, and can mitigate a framing effect where medical risk information is framed in a positive or negative light (Garcia-Retamero & Galesic, 2010; Garcia-Retamero & Cokely, 2017). Future research should attempt to replicate this finding, and explore any underlying cognitive mechanisms that might help explain this result. Perhaps most concerning, results from Study Two indicated that participant ratings of belief in eyewitness accuracy, suspect guilt, and verdict, did not differ as a function of whether an eyewitness indicated that they were 70% or 90% confident at the time of the initial identification. This result is concerning, because an appropriately-collected confidence rating should be informative (Brewer & Wells, 2006; Palmer et al., 2013; Keast, Brewer, & Wells, 2007). Accordingly, we recommend that future research be conducted exploring the degree to which people can distinguish between numerical confidence estimates (e.g., 90% vs 60% or 20% vs 50%).

A potential limitation, particularly in Study Two, is that participants were obviously not real jury members, and the relevant crime and identification scenarios

were fictitious and simplified simulations of the information jurors encounter in a real-world trial. Given that jury decision-making within a real-world setting can evoke a number of psychological processes relating to the theoretical constructs of memory, persuasion, decision-making, stereotyping, and group behaviour, it is possible that some characteristics of participant decision-making in Study Two differed from a real-world setting (Bornstein & Greene, 2011). Although this may question the ecological validity of the present research, a literature review conducted by Bornstein (1999) demonstrated that the majority of research using mock-jurors has obtained consistent results across modes of presentation (e.g., court transcript, visual and audio recordings, and re-enactments), and mock-jury samples (e.g., community members and undergraduate students). Moreover, Kerr and Bray (2017, p. 350) stated that, based on the “current state of theory and research”, it does appear “unjustifiable to dismiss the utility of standard simulation”. Accordingly, the results from Study Two should not be dismissed on the basis that participant were not real jury members.

In summary, the results from study one suggests that presenting eyewitness confidence in verbal format may undermine the informative value of the identification evidence, due to variation in people’s interpretation of verbal expressions of confidence. Although numerical estimates of confidence did not influence juror decision-making in our study, there does exist evidence showing that eyewitness confidence does influence juror decision-making (e.g., Sauer, Palmer, & Brewer, 2017). Thus, collecting and presenting eyewitness’ initial confidence estimates in numerical format does appear to be the better option. Further, our research showed no framing effects on numerical confidence ratings in the standard

(i.e., no visual aid) condition, potentially addressing concern raised by applied practitioners about the utility of numerical estimates (Sauer & Brewer, 2015).

## References

- Barclay, S., Brown, R., Kelly, C., Peterson, C. R., Phillips, L. D., & Selvidge, J. (1977). Handbook for Decision Analysis. McLean, Va.: *Decisions and Designs Incorporated*, 2-285.
- Blanca, M., Alarcón, R., Arnau, J., Bono, R., & Bendayan, R. (2017). Non-normal data: is ANOVA still a valid option?. *Psicothema*, 29(4), 552-557. doi: 10.7334/psicothema2016.383.
- Bornstein, B. H., & Greene, E. (2011). Jury decision making: implications for and from psychology. *Current Directions in Psychological Science*, 20(1), 63-67. doi: 10.1177/0963721410397282.
- Bornstein, B. H. (1999). The ecological validity of jury simulations: is the jury still out? *Law and Human Behavior*, 23(1), 75-91. Retrieved from <https://link.springer.com/article/10.1023/A:1022326807441#Bib1>.
- Bradfield, A. L., Wells, G. L., & Olson, E. A. (2002). The damaging effect of confirming feedback on the relation between eyewitness certainty and identification accuracy. *Journal of Applied Psychology*, 87(1), 112-120. doi: 10.1037//0021-9010.87.1.112.
- Brewer, N., & Wells, G. L. (2006). The confidence-accuracy relationship in eyewitness identification: effects of lineup instructions, foil similarity, and target-absent base rates. *Journal of Experimental Psychology: Applied*, 12(1), 11-30. doi: 10.1037/1076-898X.12.1.11.
- Cassotti, M., Habib, M., Poirel, N., Aïte, A., Houdé, O., & Moutier, S. (2012). Positive emotional context eliminates the framing effect in decision-making. *Emotion*, 12(5), 926-931. doi: 10.1037/a0026788.

Cokely, E. T., Galesic, M., Schulz, E., Ghazal, S., & Garcia-Retamero, R. (2012).

Measuring risk literacy: the berlin numeracy test. *Judgment and Decision Making*, 7(1), 25-47. Retrieved from <http://psycnet.apa.org/record/2012-03055-003>.

Croskerry, P., Abbass, A. A., & Wu, A. W. (2008). How doctors feel: affective issues in patients' safety. *The Lancet*, 372(9645), 1205-1206. doi:

10.1016/S0140-6736(08)61500-7.

Croskerry, P. (2009). Clinical cognition and diagnostic error: applications of a dual process model of reasoning. *Advances in Health Sciences Education*, 14(1), 27-35. doi: 10.1007/s10459-009-9182-2.

Croskerry, P. (2005). The theory and practice of clinical decision-making. *Canadian Journal of Anesthesia/Journal Canadien D'anesthésie*, 52, R1-R8. doi:

10.1007/BF03023077.

Davies, L. (2008, June 11). Drugs trial aborted after jurors found playing sudoku.

*The Daily Telegraph*. Retrieved from

<https://www.dailytelegraph.com.au/news/nsw/jurors-caught-playing-sudoku/news-story/d0de16caf5d819c51edc22653695daa6?sv=fd064ac45c72b1a8eaeec6c12686846c>.

Donovan, R. J., & Jalleh, G. (2000). Positive versus negative framing of a hypothetical infant immunization: the influence of involvement. *Health Education & Behavior*, 27(1), 82-95. doi: 10.1177/109019810002700108.

Druckman, J. N. (2001). The implications of framing effects for citizen competence. *Political Behavior*, 23(3), 225-256. doi:

<https://doi.org/10.1023/A:10150069>.



- Evans, J. S. B. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology*, 59, 255-278. doi: 10.1146/annurev.psych.59.103006.093629.
- Galesic, M., & Garcia-Retamero, R. (2010). Statistical numeracy for health: A cross-cultural comparison with probabilistic national samples. *Archives of Internal Medicine*, 170(5), 462-468. doi: 10.1001/archinternmed.2009.481.
- Galesic, M., & Garcia-Retamero, R. (2011). Graph literacy: a cross-cultural comparison. *Medical Decision Making*, 31(3), 444-457. doi: 10.1177/0272989X10373805.
- Garcia-Retamero, R., & Cokely, E. T. (2017). Designing visual aids that promote risk literacy: a systematic review of health research and evidence-based design heuristics. *Human Factors*, 59(4), 582-627. doi: 10.1177/0018720817690634.
- Garcia-Retamero, R., Cokely, E. T., Wicki, B., & Joeris, A. (2016). Improving risk literacy in surgeons. *Patient Education and Counseling*, 99(7), 1156-1161. doi: <https://doi.org/10.1016/j.pec.2016.01.013>.
- Garcia-Retamero, R., & Galesic, M. (2010). How to reduce the effect of framing on messages about health. *Journal of General Internal Medicine*, 25(12), 1323-1329. doi: <https://doi.org/10.1007/s11606-010-1484-9>.
- Garcia-Retamero, R., Cokely, E. T., Ghazal, S., & Joeris, A. (2016). Measuring graph literacy without a test: a brief subjective assessment. *Medical Decision Making*, 36(7), 854-867. doi: 10.1177/0272989X16655334.
- Gastil, J., Burkhalter, S., & Black, L. W. (2007). Do juries deliberate? a study of deliberation, individual difference, and group member satisfaction at a

- municipal courthouse. *Small Group Research*, 38(3), 337-359. doi: 10.1177/1046496407301967.
- Guo, L., Trueblood, J. S., & Diederich, A. (2017). Thinking fast increases framing effects in risky decision making. *Psychological Science*, 28(4), 530-543. doi: 10.1177/0956797616689092.
- Handmer, J., & Proudley, B. (2007). Communicating uncertainty via probabilities: the case of weather forecasts. *Environmental Hazards*, 7(2), 79-87. doi: <https://doi.org/10.1016/j.envhaz.2007.05.002>.
- Hayes, I. (2017, February 13). Trial discharged after juror fell asleep 15 minutes into case. *The Irish Times*. Retrieved from <https://www.irishtimes.com/news/crime-and-law/courts/criminal-court/trial-discharged-after-juror-fell-asleep-15-minutes-into-case-1.2973978>.
- Kahneman, D., & Frederick, S. (2007). Frames and brains: elicitation and control of response tendencies. *Trends in Cognitive Sciences*, 11(2), 45-46. doi: 10.1016/j.tics.2006.11.007.
- Kahneman, D., & Frederick, S. (2002). Representativeness revisited: attribute substitution in intuitive judgement. In T. Gilovich, D. Griffin, D. Kahneman (Eds.), *Heuristics and Biases: The Psychology of Intuitive Judgment*. New York: Cambridge University Press.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decisions under risk. *The Econometric Society*, 47(2), 263-291. Retrieved from <http://www.jstor.org/stable/1914185>.

- Keast, A., Brewer, N., & Wells, G. L. (2007). Children's metacognitive judgments in an eyewitness identification task. *Journal of Experimental Child Psychology*, 97(4), 286-314. doi: 10.1016/j.jecp.2007.01.007.
- Kelly, S. D., Barr, D. J., Church, R. B., & Lynch, K. (1999). Offering a hand to pragmatic understanding: the role of speech and gesture in comprehension and memory. *Journal of Memory and Language*, 40(4), 577-592. doi: <https://doi.org/10.1006/jmla.1999.2634>.
- Kerr, L. K., & Bray, R. M. (2017). Simulation, Realism, and the Study of the Jury. In Brewer, N., & Williams, K. D. (Eds.). (2017). *Psychology and Law: An Empirical Perspective*. Guilford Publications.
- Levin, I. P., & Gaeth, G. J. (1988). How consumers are affected by the framing of attribute information before and after consuming the product. *Journal of Consumer Research*, 15(3), 374-378. Retrieved from <http://www.jstor.org/stable/2489471>.
- Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: a typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes*, 76(2), 149-188. doi: <https://doi.org/10.1006/obhd.1998.2804>.
- Luus, C. A., & Wells, G. L. (1994). The malleability of eyewitness confidence: co-witness and perseverance effects. *Journal of Applied Psychology*, 79(5), 714. doi: <http://dx.doi.org/10.1037/0021-9010.79.5.714>.
- Malpass, R. S., & Devine, P. G. (1981). Eyewitness identification: lineup instructions and the absence of the offender. *Journal of Applied Psychology*, 66(4), 482-489. doi: <http://dx.doi.org/10.1037/0021-9010.66.4.482>.

- McElroy, T., & Seta, J. J. (2003). Framing effects: An analytic–holistic perspective. *Journal of Experimental Social Psychology*, 39(6), 610-617. doi: [http://dx.doi.org/10.1016/S0022-1031\(03\)00036-2](http://dx.doi.org/10.1016/S0022-1031(03)00036-2).
- Mitchell, T. L., Haw, R. M., Pfeifer, J. E., & Meissner, C. A. (2005). Racial bias in mock juror decision-making: a meta-analytic review of defendant treatment. *Law and Human Behavior*, 29(6), 621-637. doi: 10.1007/s10979-005-8122-9.
- O'Brien, B. J. (1989). Words or numbers? The evaluation of probability expressions in general practice. *Journal of the Royal College of General Practitioners*, 39(320), 98-100. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1711769/>.
- O’Keeffe, M. (2018, March 27). Fatigue sets in as delays test patience of the jury. *Irish Daily Mail*. Retrieved from <https://www.pressreader.com/ireland/irish-daily-mail/20180327/281578061210370>.
- Palmer, M. A., Brewer, N., Weber, N., & Nagesh, A. (2013). The confidence-accuracy relationship for eyewitness identification decisions: effects of exposure duration, retention interval, and divided attention. *Journal of Experimental Psychology: Applied*, 19(1), 55- 71. doi: 10.1037/a0031602.
- Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and Persuasion: Classic and Contemporary Approaches*. Dubuque, IA: WC Brown Co.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Communication and Persuasion* (pp. 1-24). New York, NY: Springer.
- Police and Criminal Evidence Act (PACE, 1984) Codes of Practice: Code D (2017). Retrieved January 8th, 2018, from

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/592562/pace-code-d-2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/592562/pace-code-d-2017.pdf).

- Powell, M., Garry, M. and Brewer, N. (2013). Eyewitness testimony. In I. R. Freckelton & H. Selby (Eds.), *Expert Evidence: Law, Practice, Procedure and Advocacy*. Pyrmont, N.S.W: Thomson Reuters.
- Reyna, V. F., Nelson, W. L., Han, P. K., & Dieckmann, N. F. (2009). How numeracy influences risk comprehension and medical decision making. *Psychological bulletin*, 135(6), 943-973. doi: 10.1037/a0017327.
- Robertson, N., Davies, G., & Nettleingham, A. (2009). Vicarious traumatisation as a consequence of jury service. *The Howard Journal of Criminal Justice*, 48(1), 1-12. doi: 10.1111/j.1468-2311.2008.00539.x.
- Sauer, J. D., & Brewer, N. (2015). Confidence and accuracy of eyewitness identification. In T. Valentine & J. P. Davis (Eds.), *Forensic Facial Identification: Theory and Practice of Identification From Eyewitnesses, Composites and CCTV* (pp.185-208). doi: 10.1002/9781118469538.
- Sauer, J. D., Palmer, M. A., & Brewer, N. (2017). Mock-juror evaluations of traditional and ratings-based eyewitness identification evidence. *Law & Human Behavior*, 41, 375- 384. doi: <http://dx.doi.org/10.1037/lhb0000235>.
- Shaw III, J. S., & McClure, K. A. (1996). Repeated postevent questioning can lead to elevated levels of eyewitness confidence. *Law and Human Behavior*, 20(6), 629-653. doi: <http://dx.doi.org/10.1007/BF01499235>.
- Schwartz, L. M. L., Woloshin, S. S., Black, W. C. W., & Welch, H. G. H. (1997). The role of numeracy in understanding the benefit of screening mammography. *Annals of Internal Medicine*, 127(11), 966–972. doi: 10.7326/0003-4819-127-11-199712010-00003.

- Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2007). The affect heuristic. *European Journal of Operational Research*, 177(3), 1333-1352. doi: doi:10.1016/j.ejor.2005.04.006.
- Stanovich, K. E., & West, R. F. (2000). Individual differences in reasoning: implications for the rationality debate? *Behavioral and Brain Sciences*, 23(5), 645-665. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/11301544>.
- Takemura, K. (1994). Influence of elaboration on the framing of decision. *The Journal of Psychology*, 128(1), 33-39. doi: <http://dx.doi.org/10.1080/00223980.1994.9712709>.
- Technical Working Group for Eyewitness Evidence (1999). Eyewitness evidence: a guide for law enforcement. Washington, DC: U.S. Department of Justice.
- The Innocence Project. (2017). *Eyewitness misidentification*. Retrieved from <https://www.innocenceproject.org/causes/eyewitness-misidentification/>.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458. doi: 10.1126/science.7455683.
- Van de Mortel, T. F. (2008). Faking it: social desirability response bias in self-report research. *Australian Journal of Advanced Nursing*, 25(4), 40-48. doi: [https://epubs.scu.edu.au/hahs\\_pubs/2/](https://epubs.scu.edu.au/hahs_pubs/2/).
- Vrij, A., & Firmin, H. R. (2001). Beautiful thus innocent? the impact of defendants' and victims' physical attractiveness and participants' rape beliefs on impression formation in alleged rape cases. *International Review of Victimology*, 8(3), 245-255. doi: 10.1177/026975800100800301.
- Wells, G. L. (1993). What do we know about eyewitness identification?. *American Psychologist*, 48(5), 553-571. doi: <http://dx.doi.org/10.1037/0003-066X.48.5.553>.

- Williams, M. R., Demuth, S., & Holcomb, J. E. (2007). Understanding the influence of victim gender in death penalty cases: the importance of victim race, sex-related victimization, and jury decision making. *Criminology*, 45(4), 865-891. doi: 10.1111/j.1745-9125.2007.00095.x.
- Windschitl, P. D., & Wells, G. L. (1996). Measuring psychological uncertainty: verbal versus numeric methods. *Journal of Experimental Psychology: Applied*, 2(4), 343- 364. doi: 10.1037/1076-898X.2.4.343.
- Wixted, J. T., & Wells, G. L. (2017). The relationship between eyewitness confidence and identification accuracy: a new synthesis. *Psychological Science in the Public Interest*, 18(1), 10-65. doi: 10.1177/152910061668966.
- White, R., & Perrone, S. (2015). *Crime, Criminality & Criminal Justice (6th ed.)*. Victoria: Oxford University Press.

## Appendix A

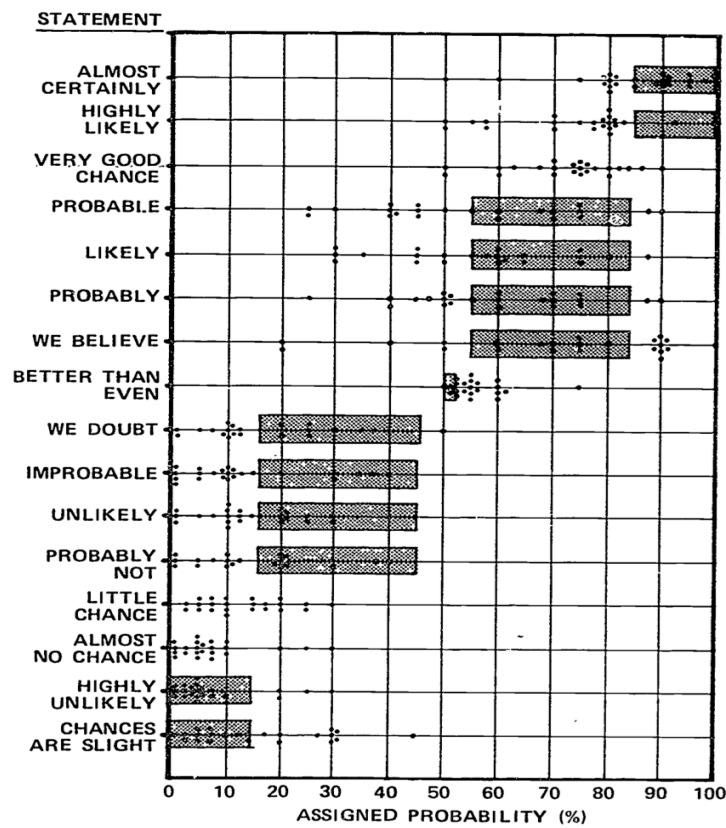


Figure 5. Results from study reported in Barclay et al. (1977, pg. 79).



## Appendix B

### Study One: Materials

Sometimes, after a crime has taken place, police will ask a witness or victim of the crime to view a line-up and attempt to identify the offender. Below are statements made by people who have witnessed a crime, and have subsequently identified someone from a 6-person line-up (i.e. containing the police's suspect and 5 people who were known to be innocent) at a local police station. Sometimes, after identifying someone from a line-up, witnesses will provide an expression of confidence in the accuracy of their identification. Please rate, on a scale from 0% (not at all likely to be accurate) to 100% (extremely likely to be accurate), how likely you think it is that the witness's identification was accurate, based on their verbal expressions of confidence:

After having selected from a line-up, the witness states:

"I am almost certain that my identification was accurate."

"It is highly likely that my identification was accurate."

"There is a very good chance that my identification was accurate."

"It is probable that my identification was accurate."

"It is likely that my identification was accurate."

"My identification was probably accurate."

"I believe that my identification was accurate."

"There is better than even chance that my identification was accurate."

"I doubt that my identification was accurate."

"It is improbable that my identification was accurate."

"It is unlikely that my identification was accurate."

"My identification was probably not accurate."

"There is little chance that my identification was accurate."

"There is almost no chance that my identification was accurate."

"It is highly unlikely that my identification was accurate."

"The chances are slight that my identification was accurate."

"There is little chance that my identification was accurate."

## Appendix C

Table 1

*Descriptive Statistics for Verbal Expressions of Eyewitness Confidence*

| Expression              | <i>M (SD)</i> | Range  |
|-------------------------|---------------|--------|
| Almost Certain          | 76.80(19.29)  | 25-100 |
| Highly Likely           | 71.70(24.83)  | 5-100  |
| Very Good Chance        | 70.68(20.59)  | 10-100 |
| Probable                | 58.43(19.53)  | 10-95  |
| Likely                  | 66.25(17.94)  | 15-100 |
| Probably                | 59.93(21.13)  | 10-95  |
| I believe               | 69.45(22.31)  | 1-100  |
| Better Than Even Chance | 59.41(19.54)  | 1-100  |
| Doubt                   | 22.39(26.02)  | 0-100  |
| Improbable              | 22.64(23.72)  | 0-95   |
| Unlikely                | 23.75(24.94)  | 0-100  |
| Probably Not            | 23.55(22.58)  | 0-95   |
| Little Chance           | 14.95(19.94)  | 0-100  |
| Almost No Chance        | 15.45(24.19)  | 0-100  |
| Highly Unlikely         | 18.68(26.32)  | 0-100  |
| Slight                  | 24.01(23.12)  | 0-90   |

## Appendix D

Table 2

*Study Two: Table of Conditions and Number of  
Participants (n)*

| Condition                         | <i>n</i> |
|-----------------------------------|----------|
| Uncertainty – moderate – no graph | 20       |
| Uncertainty – moderate – graph    | 20       |
| Uncertainty – high – no graph     | 20       |
| Uncertainty – high – graph        | 20       |
| Certainty – moderate – no graph   | 21       |
| Certainty – moderate - graph      | 20       |
| Certainty – high – no graph       | 20       |
| Total                             | 163      |

## Appendix E

## Study Two: Question and Response Format

Please answer the following questions:

•

**Please indicate the degree to which you believe the eyewitness is inaccurate/accurate in their identification of the suspect, Mr. Green:**

|                          |                       |                       |                       |                       |                       |                       |                       |                       |                       |                        |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
|                          | - - - -               | - - -                 | - -                   | -                     |                       | +                     | ++                    | +++                   | ++++                  |                        |
| Certain to be inaccurate | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Certain to be accurate |

•

**Please indicate the degree to which you believe the suspect, Mr. Green, is innocent or guilty of having committed the crime in which he is accused:**

|                        |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
|                        | - - - -               | - - -                 | - -                   | -                     |                       | +                     | ++                    | +++                   | ++++                  |                      |
| Certain to be innocent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Certain to be guilty |

•

**If you were acting as juror in the present case, please specify the verdict that you would reach:**

**Please select at most one answer**

☐ Guilty

☐ Not Guilty

## Appendix F

### Study Two: Mock Police Report

#### **Case Facts:**

On 01/04/2017 at approximately 1520 hours, a panic alarm at Westwealth Bank was activated, alerting police to an attempted robbery.

A team of police officers arrived at Westwealth Bank at 1530 hours, to find that the offender had already fled the crime scene. According to eyewitness reports, a man of average height and build, wearing a black face-mask, blue jeans, and a black jacket, had entered the premises at approximately 1510 hours, holding a small handgun. According to witness statements, the offender had approached a desk clerk working at the central counter, pointed a gun in her direction, and demanded that she open the bank safe and pass him its contents.

At this time, another employee, Mr. Watts, had reportedly activated the panic alarm from underneath his desk, causing a siren to emit throughout the building. This alarm had allegedly startled the offender, causing him to flee from the premises having only taken a \$100 cheque that had been sitting

on the counter. Immediately after exiting the building, the offender had reportedly removed his face mask to avoid suspicion from pedestrians walking along the side-walk. One witness, Mr. Smith, reports to have seen the offender take off his mask and walk into a large crowd of people.

At approximately 1535 hours, a patrolling officer in a neighbouring area pulled over a driver who appeared to be driving erratically. The male driver, Mr. Green, was of average height and build, and wore blue jeans and a white t-shirt. Having been informed about the recent armed robbery by a colleague, constable Cullen suspected that Mr. Green, who matched the general description of the armed robber, might be the escaping criminal, and requested that he come to the police station for further questioning.

## Appendix G

### Study Two: Court Transcript

**Instructions:** You have been selected as a jury member for this criminal case within an Australian Court of Law. It is your job to determine whether the suspect, Mr. Green, is guilty or not guilty of aggravated armed robbery, which can carry a prison sentence of up to 25 years.

A trial-transcript is provided below, which details exchanges between the prosecution, judge, eyewitness, and the defence council. Please read this carefully.

#### **Court transcript in the matter of State v Green:**

**Prosecution:** Your Honour, I now refer you to the affidavit of Mr. Smith affirmed on the 2<sup>nd</sup> of April 2017, who was standing in close proximity to the banks entrance when the attempted armed robbery occurred. Your Honour will note from paragraph 3 of Mr. Smith's affidavit that he was visiting the bank at the time of the robbery.

**Judge:** Counsel, was Mr. Smith an eyewitness?

**Prosecution:** Yes, your Honour.

**Judge:** Please continue.

**Prosecution:** Your Honour, I would like to call upon this witness for the prosecution; Mr. Smith.

Swearing in of witness

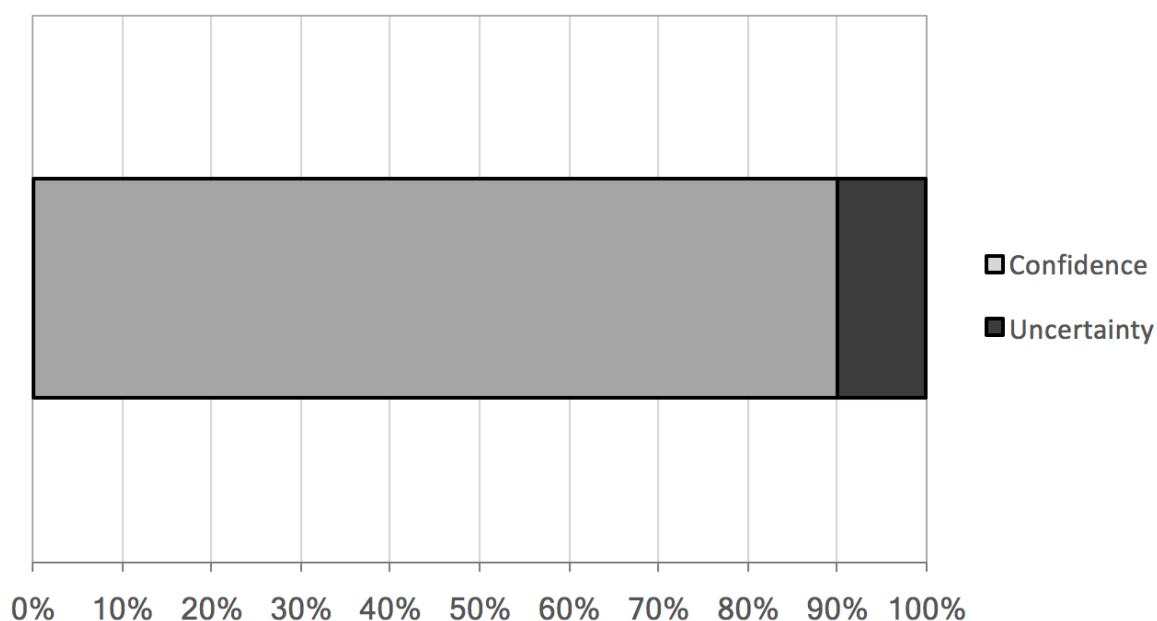
**Prosecution:** Mr. Smith, I refer you to paragraph 17 to 21 of your affidavit. Please tell the court what happened when you were called to the police station on the 2<sup>nd</sup> of April 2017.

**Eyewitness:** When I was asked to present myself at the police station and identify who I saw leaving the bank after the robbery, I agreed to do so. At the police station, I was asked to stand in a room with an officer, whilst 7 people were brought into an adjacent room with a large one-way window separating us. The officer asked me to identify, if possible, the man who had removed his face-mask once having exited the bank.



**Prosecution:** What happened next?

**Eyewitness:** I selected the defendant, Mr. Green, from the line-up. The officer asked me to indicate from 0 to 100% how confident I was that I had correctly identified the criminal. I informed the officer that I was 90% confident (refer to graph).



**Prosecution:** Thank you Mr. Smith. Your Honour, I have no further questions for the witness.

**Judge:** Do you have any questions, counsel [defence counsel]?

**Defence counsel:** Yes your Honour, I have one question for Mr. Smith.

**Judge:** Please proceed.

**Defence counsel:** Mr. Smith, you said that at the time of your identification you were 90% confident. Do you therefore acknowledge that you were 10% uncertain as to whether you had correctly identified the true perpetrator from the line-up?

**Eyewitness:** I do acknowledge this fact.

**Defence counsel:** No further questions your Honour.

## Appendix H

Table 3

*Interaction Between Graph and Salience (Means and 95%CI intervals)*

|                         | No Graph |              | Graph    |              |
|-------------------------|----------|--------------|----------|--------------|
|                         | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Belief in Suspect Guilt |          |              |          |              |
| Uncertainty Salient     | 5.50     | [5.02, 5.98] | 5.83     | [5.35, 6.31] |
| Certainty Salient       | 5.69     | [5.21, 6.16] | 4.90     | [4.43, 5.36] |
| Belief in Eyewitness    | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Accuracy                |          |              |          |              |
| Uncertainty Salient     | 6.20     | [5.66, 6.74] | 6.40     | [5.86, 6.94] |
| Certainty Salient       | 6.03     | [5.50, 6.56] | 5.77     | [5.24, 6.29] |

*Note:* CI = Confidence intervals

Table 4

*Main Effect of Graph (Means and 95%CI intervals)*

|                               | No Graph |              | Graph    |              |
|-------------------------------|----------|--------------|----------|--------------|
|                               | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Continuous Measure            |          |              |          |              |
| Belief in Suspect Guilt       | 5.59     | [5.26, 5.93] | 5.36     | [5.03, 5.70] |
| Belief in Eyewitness Accuracy | 6.12     | [5.74, 6.49] | 6.08     | [5.71, 6.46] |

*Note:* CI = Confidence intervals

Table 5

*Main Effect of Confidence (Means and 95%CI intervals)*

| Continuous Measure            | Moderate Confidence |              | High Confidence |              |
|-------------------------------|---------------------|--------------|-----------------|--------------|
|                               | <i>M</i>            | 95%CI        | <i>M</i>        | 95%CI        |
| Belief in Suspect Guilt       | 5.39                | [5.06, 5.73] | 5.56            | [5.23, 5.90] |
| Belief in Eyewitness Accuracy | 5.93                | [5.55, 6.31] | 6.27            | [5.90, 6.65] |

*Note:* CI = Confidence intervals

Table 6

*Number of Guilty and Not Guilty Verdicts within the Moderate and High Confidence Condition (n)*

| Verdict    | Moderate Confidence | High Confidence |
|------------|---------------------|-----------------|
|            | <i>n</i>            | <i>n</i>        |
| Guilty     | 20                  | 22              |
| Not Guilty | 61                  | 60              |

*Note:* *n* = Number of participants

Table 7

*Interaction Between Salience and Confidence (Means and 95%CI intervals)*

|                         | Moderate<br>Confidence (70%) |              | High Confidence (90%) |              |
|-------------------------|------------------------------|--------------|-----------------------|--------------|
|                         | <i>M</i>                     | 95%CI        | <i>M</i>              | 95%CI        |
| Belief in Suspect Guilt |                              |              |                       |              |
| Uncertainty Salient     | 5.43                         | [4.95, 5.91] | 5.90                  | [5.42, 6.38] |
| Certainty Salient       | 5.36                         | [4.89, 5.84] | 5.22                  | [4.75, 5.69] |
| Belief in Eyewitness    | <i>M</i>                     | 95%CI        | <i>M</i>              | 95%CI        |
| Accuracy                |                              |              |                       |              |
| Uncertainty Salient     | 6.03                         | [5.49, 6.56] | 6.58                  | [6.04, 7.11] |
| Certainty Salient       | 5.83                         | [5.30, 6.36] | 5.97                  | [5.44, 6.49] |

*Note:* CI = Confidence intervals

Table 8

*Interaction Between Graph and Confidence (Means and 95%CI intervals)*

|                         | Moderate<br>Confidence |              | High Confidence |              |
|-------------------------|------------------------|--------------|-----------------|--------------|
|                         | <i>M</i>               | 95%CI        | <i>M</i>        | 95%CI        |
| Belief in Suspect Guilt |                        |              |                 |              |
| No Graph                | 5.39                   | [4.91, 5.86] | 5.80            | [5.32, 6.28] |
| Graph                   | 5.40                   | [4.92, 5.88] | 5.32            | [4.85, 5.79] |
| Belief in Eyewitness    | <i>M</i>               | 95%CI        | <i>M</i>        | 95%CI        |
| Accuracy                |                        |              |                 |              |
| No Graph                | 5.81                   | [5.27, 6.34] | 6.43            | [5.89, 6.97] |
| Graph                   | 6.05                   | [5.51, 6.59] | 6.12            | [5.59, 6.64] |

*Note:* CI = Confidence intervals

Table 9

*Participant Ratings of Belief in Eyewitness Identification: Three Way Interaction of Salience, Confidence, and Graph (Means and 95%CI intervals)*

|                     | No Graph |              | Graph    |              |
|---------------------|----------|--------------|----------|--------------|
|                     | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Uncertainty Salient |          |              |          |              |
| Moderate Confidence | 5.85     | [5.09, 6.61] | 6.2      | [5.44, 6.96] |
| High Confidence     | 6.55     | [5.79, 7.31] | 6.60     | [5.84, 7.36] |
| Certainty Salient   | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Moderate Confidence | 5.76     | [5.02, 6.51] | 5.90     | [5.14, 6.66] |
| High Confidence     | 6.30     | [5.54, 7.06] | 5.64     | [4.91, 6.36] |

*Note:* CI = Confidence intervals

Table 10

*Participant Ratings of Belief in Suspect Guilt: Three Way Interaction of Salience, Confidence, and Graph (Means and 95%CI intervals)*

|                     | No Graph |              | Graph    |              |
|---------------------|----------|--------------|----------|--------------|
|                     | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Uncertainty Salient |          |              |          |              |
| Moderate Confidence | 5.25     | [4.57, 5.93] | 5.60     | [4.92, 6.28] |
| High Confidence     | 5.75     | [5.07, 6.43] | 6.05     | [5.37, 6.73] |
| Certainty Salient   | <i>M</i> | 95%CI        | <i>M</i> | 95%CI        |
| Moderate Confidence | 5.52     | [4.86, 6.19] | 5.20     | [4.52, 5.88] |
| High Confidence     | 5.85     | [5.17, 6.53] | 4.59     | [3.94, 5.24] |

*Note:* CI = Confidence intervals

## Appendix I

Participant information sheet: Study One

### **A Study on Eyewitness Accuracy**

#### **[Information sheet]**

#### **1. Invitation**

You are invited to participate in a study that investigates jury decision-making within a court of law. This study will be conducted by Tatjana Peisker-Richings under the supervision of Dr. Jim Sauer, as part of their fourth-year Honours project at the University of Tasmania (Department of Psychology).

#### **2. What is the purpose of this study?**

This study aims to investigate how people differ in their perceptions of eyewitness accuracy when presented with various expressions of eyewitness confidence.

#### **3. Why have I been invited to participate?**

You have been invited to participate in this study as you are 18 years of age or older. There will be no negative consequences if you choose not to participate in this study, as participation is entirely voluntary.

#### **4. What will I be asked to do?**

If you do decide to volunteer, you will be asked to rate various expressions of eyewitness confidence on a scale from 0% (not at all likely to be accurate) to 100% (extremely likely to be accurate). You will also be asked to provide some basic demographic information.

This study will be conducted entirely online and take approximately 10 minutes to complete.

#### **5. Are there any possible benefits from participation in this study?**

Participating in this study is not expected to result in any direct benefits. However, if you do decide to participate, you will be entered into the draw to win a \$50 voucher, or receive 30 minutes research participation credit (if a first-year psychology student).

**6. Are there any possible risks from participating in this study?**

There are no foreseeable harms and/or risks that will result from participating in this study.

**7. What if I change my mind during or after the study?**

If you do decide to participate, you may choose to withdraw from the study at any moment. As participation in this study is entirely voluntary, you will not be expected to give any explanation for your decision to do so. If you do decide to leave the study during its undertaking, information provided by you up until this point will not be recorded. However, it will not be possible to delete information after data-collection has taken place (i.e. you have submitted your questionnaire), as all information is given anonymously.

**8. What will happen to the information when the study is over?**

All data will be kept by the University of Tasmania, on a password-protected database. In accordance with best practice for open science, (anonymised) data will be retained so that it can be accessed by other researchers in the future. All data will be stored anonymously, in electronic format.

**9. How will the results of the study be published?**

Given that this research is being conducted as part of a fourth-year honours project, a summary of the results can be obtained by contacting the researcher after the date of thesis submission (18<sup>th</sup> October).

**10. What if I have questions about this study?**

If you have any questions regarding this study, please contact the research team using the contact details provided.

Tatjana Peisker-Richings: [tpeisker@utas.edu.au](mailto:tpeisker@utas.edu.au)

Dr Jim Sauer: [Jim.Sauer@utas.edu.au](mailto:Jim.Sauer@utas.edu.au)

This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email [human.ethics@utas.edu.au](mailto:human.ethics@utas.edu.au). The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number H0012660.



## Appendix J

Participant information sheet: Study Two

### **A Study on Jury Decision-Making**

#### **[participant information sheet]**

#### **1. Invitation**

You are invited to participate in a study that investigates jury decision-making within a court of law. This study will be conducted by Tatjana Peisker-Richings under the supervision of Dr. Jim Sauer, as part of their fourth-year Honours project at the University of Tasmania (Department of Psychology).

#### **2. What is the purpose of this study?**

This study aims to investigate how people differ in their perceptions of eyewitness accuracy and suspect guilt when presented with evidence from a mock police report and criminal trial.

#### **3. Why have I been invited to participate?**

You have been invited to participate in this study as you are 18 years of age or older. There will be no adverse consequences if you choose not to participate in this study, as participation is entirely voluntary.

#### **4. What will I be asked to do?**

If you do decide to volunteer, you will be asked to read a mock police report and court transcript that details information (and evidence) about an aggravated armed robbery. Based on these documents, you will be asked some questions relating to eyewitness accuracy and suspect guilt. Having answered these questions, you will be asked to provide some demographic information. Any information provided by you will remain anonymous.

This study will be conducted entirely online and take approximately 30 minutes to complete.

**5. Are there any possible benefits from participation in this study?**

Participating in this study is not expected to result in any direct benefits. However, if you do decide to participate, you will be entered into the draw to win a \$50 voucher, or receive 30 minutes research participation credit (if a first-year psychology student).

**6. Are there any possible risks from participating in this study?**

There are no foreseeable harms and/or risks that will result from participating in this study, other than being exposed to a mock crime scenario in which an aggravated armed robbery has occurred. If there is a reason to believe that this will cause you distress, we advise that you do not participate.

**7. What if I change my mind during or after the study?**

If you do decide to participate, you may choose to withdraw from the study at any moment. As participation in this study is entirely voluntary, you will not be expected to give any explanation for your decision to do so. If you do decide to leave the study during its undertaking, information provided by you up until this point will not be recorded. However, it will not be possible to delete information after data-collection has taken place (i.e. you have submitted your questionnaire), as all information is given anonymously.

**8. What will happen to the information when the study is over?**

All data will be kept by the University of Tasmania, on a password-protected database. In accordance with best practice for open science, (anonymised) data will be retained so that it can be accessed by other researchers in the future. All data will be stored anonymously, in electronic format.

**9. How will the results of the study be published?**

Given that this research is being conducted as part of a fourth-year honours project, a summary of the results can be obtained by contacting the researcher after the date of thesis submission (18<sup>th</sup> October).

**10. What if I have questions about this study?**

If you have any questions regarding this study, please contact the research team using the contact details provided.

- Tatjana Peisker-Richings: [tpeisker@utas.edu.au](mailto:tpeisker@utas.edu.au)
- Dr Jim Sauer: [Jim.Sauer@utas.edu.au](mailto:Jim.Sauer@utas.edu.au)

This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email [human.ethics@utas.edu.au](mailto:human.ethics@utas.edu.au). The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number H0012660.

## Appendix K

### Copy of Email Showing Ethics Approval:

Dear Dr Palmer

Ethics Ref: H0012660

Title: Confidence in memory

This email is to confirm that the following amendment was approved by the Chair of the Tasmania Social Sciences Human Research Ethics Committee on 26/7/2018:

- Addition of student researchers Tatjana Peisker-Richings and Meriel Charles

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the National Statement on Ethical Conduct in Human Research (NHMRC 2007, updated May 2015).

This email constitutes official approval. If your circumstances require a formal letter of amendment approval, please let us know.

Should you have any queries please do not hesitate to contact me.

Kind regards  
Katherine